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**educational outcomes
in less developed
countries:
analysis and
evaluation tools**

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I. Introduction

Education in the developing world has been assigned a major, multi-purpose role--economic, social, and political--with diverse weights attached to these roles in different nations. In pursuit of these purposes, education in almost all nations has claimed a large share of resources. This share reflects the priority given by nations to the development of the capacity of people to work and to advance to a more elevated status.

Fiscal and other economic constraints facing nations are severe. Resources for education come at sizable opportunity costs in terms of optional resource use. These constraints underscore the need for careful and detailed planning for educational development focused on the identified purposes. The question central to planning is measurement of progress made toward these purposes. How is effectiveness of education to be measured? How do we know what a nation gets for the resources spent on school systems?

Until recently educational requirements have been measured in terms of inputs. Such indices as proportion of persons in each age group enrolled in school, classroom size, expenditure per pupil, and teacher training and compensation were the operative criteria in judging an educational system. Effectiveness measurements change the basis for judging the educational system from such input or process variables to

output indices that can yield more direct assessments of deficiencies, gaps, and additional requirements.

Major resource allocation and financial policies are dependent on output concepts and their measurement. When the objectives of educational systems are described and measured, the product of education can also be described and quantified. Such measurements can be used as guidelines for need assessment and for the allocation of resources to meet those needs. The measurements can also become basic data for determining the actual results of budget and program decisions and for evaluating such decisions.

Investment in human capital is undertaken by nations to increase economic productivity and to enlarge the national product. It makes good sense for developing nations, especially those with many labor resources and relatively little physical capital, to develop and use those human resources effectively. But the effectiveness of such human development will depend upon whether the training produces skills which can be productively used in the economy.

The social demand for education is large and difficult to predict. Effectiveness criteria related to goals underlying the social demand can help to judge the extent to which the goals are being achieved, and to quantify unmet demands. Private goals include improvement in income and social status, and are heavily dependent upon use of the skills learned. But social demands for more education for the purposes of learning, enjoying, understanding and developing living skills can contribute to personal well-being.

A consideration of education's role in increasing productivity must be set within the context of a nation as a whole. Investment in education serves broad purposes in a nation's social and political development; therefore, measurement of outputs will reflect a wide range of educational objectives. Thus, educational planning as a part of overall planning for economic development, social mobility, and political advancement has to be concerned with the questions of what programs, at what levels, for whom in the population, and with what timetable. Smooth economic growth requires a balanced growth of savings and investment, of supply of educated manpower, and of employment opportunities generated by new investments. Without a careful synchronization of manpower development and industrialization, deficiencies in education would appear as bottlenecks to economic growth. Without a careful synchronization of education and employment, deficiencies in opportunities for employment appear as bottlenecks to social development.

Foreign assistance to developing countries is increasingly being tied to analytical studies that consider educational aims and content for human resource development. Through several organizations--International Bank for Reconstruction and Development (IBRD), United Nations Educational Scientific and Cultural Organization (UNESCO), International Institute of Educational Planning (IIEP), and Organisation for Economic Cooperation and Development (OECD)--the donor nations have sought to encourage and support efforts to re-examine educational systems. They have urged the development of educational structures, curricula, teaching equipment, teaching methods, and teaching certification to meet the special problems and conditions in particular developing countries.

Objective evaluation of ongoing educational methods has been emphasized along with the analysis of new programs and activities.

The Need To Measure Educational Outputs

What are the outputs of education? We have had schools throughout history. Education policy is formulated daily by teachers, administrators, legislative and executive bodies. Nations as indicated earlier invest vast sums in education. One might conclude, then, that there must exist clear and consistent objectives which are pursued through educational activities. If a coherent set of educational objectives exists, then it should be relatively easy to identify the outputs toward which all the activity and discussion are directed.

But the question is far more complex. Despite the general agreement that education is worthwhile and the more education the better, there appears to be little consensus on the specific goals and objectives of education. Technical problems exist in attempting to measure the extent to which the objectives are met. Few goals and objectives are stated in sufficient detail to make possible many conclusions about what they imply for intended specific results. Also, goals may be expected to change over time.

Moreover, policy officials who state goals and objectives for a nation's education system are not directly involved in delivering the educational services to which those goals and objectives relate. Thus, the linkages between statements of policy intent and the actual development of individual learning skills, knowledges, attitudes, and values are frequently weak and sometimes do not exist at all; as a result, lists of policy goals and objectives are rarely useful bases for deriving

specific education output measures.

The search for goals and objectives as a guide for selecting output measures is a search for criteria on the basis of which output measures can be sorted and applied in program analysis. Economists typically solve the problem by settling on economic criteria. But education contributes to a broad range of other personal and social objectives, and should be assessed by a number of other than economic criteria.

Economic Concepts

There are a number of significant differences between the concept of output used in connection with traditional economic production processes and the concept applied to education. There does not exist a single metric in education comparable to market "price" by which all outputs can be commonly and summarily valued and compared. Schools do not start the learning processes as a manufacturer begins production. Output measurement must be directed toward changes which occur in existing characteristics. There is no product which, like an automobile, represents the finished product of the educational production process. Inputs and outputs in education are relative. An individual represents both the output of previous learning experiences and the input to subsequent learning experiences. Manufacturing processes have specifiable beginning and ending points, but an individual learns at varying rates from the very beginning to the very end of his life. One practical consequence of the continuing nature of learning is that output measurement should occur intermittently over time if changes are to be observed. The outputs of education have many dimensions with trade-offs and side

effects. Finally, unlike most production processes, in education there is no single producer which controls the full range of inputs required for a given product. The sources of individual learning are multiple; the school represents only one of them.

Achievement and the Other Three A's

Much more will be said about the measurement of cognitive skills, academic achievements, and the capacity of the educational system to ferret out talent and develop it for development. But study suggests that there are other important aspects of education--the impression on attitudes, aptitudes, and attributes. Education, formal and informal, has an effect on an individual's developing self and helps determine whether a person feels controlled by fate or responsible for his or her own destiny. At the same time, the individual's degree of self-esteem and sense of control, i.e., confidence, will affect achievement in school.

The attitudes toward progress, toward change from tradition, and to risk taking and modernization are vital to development.

The Purpose of the Study

The present volume represents an initial effort to bring together information about educational outcomes, including the role and use of measurement, types of measures, and consequences of measurements. The purpose is to provide a basis for Ministers of Finance, Planning, and Education to evaluate how and where they might best affect their educational systems to further that goal and to stimulate national development.

Chapter II

A REVIEW OF EDUCATIONAL PLANNING IN LESS DEVELOPED COUNTRIES

Education plays a vital role in the development of a country. Its explicit purview is the development of a nation's intellectual resources. Its commitment to the individual is to expand his/her capacity to think creatively, to know, to develop one's person; its obligation to the nation is to prepare a self-reliant citizenry capable of a full economic, social, and political life.

Development for much of the world means taking the concept of nationhood, i.e., national self-determination, seriously in both form and content. A requirement of development is that nationals shape a country's policy, and control and staff its institutions. Thus, one role of education is to provide a skilled and confident body of domestic leadership.

Most developing countries have agrarian-based economies. Another important role of education is thus to meet the needs of the mass of rural people (mostly peasants) often illiterate and lacking in basic modern skills. A minimal education may permit them to improve their immediate environment and to articulate their needs. It may also encourage them to play a productive part in a nation's development and enable them to share in the country's growth.

The economic, political, and historic conditions of each country shape the national development goals and affect educational policy

concerning those goals. Educational policy makers require useful outcome measures to adequately define the criteria to assess how well the educational system is fulfilling its roles and influencing the development goals. Outcome measures are needed to assess ahead of time the relative costs and effectiveness of educational program options, and on an ex poste basis to evaluate the success of the strategies and projects adopted.

Broad Policy Uses Of Outcome Measurements

There is demand in most countries for rapid change on a number of fronts. With very limited resources available, national policy makers must make careful choices. To paraphrase Julius Nyerere, President of Tanzania, planning is choosing. Coordinated planning can assist in charting the broad path of development.

Educational planners are one part of the national body of policy makers who will frame and implement development goals. Their presence in the debate insures that education is used as a tool to achieve certain goals and that the development of education is also seen as a goal.

Educational and developmental goals which have been articulated must be translated into educational targets. Educational planners can then assess measured outcomes against the specific targets. Where there is inconsistency or infeasibility, they must alert other policy makers to the bottleneck and/or attempt to initiate reforms in the educational system. This process of feedback into national or regional policy is a requirement of realistic development plan.

The specific policy uses of educational program assessment which incorporates accurate outcome measurements are:

1. to determine what children and adults, young and old, are learning to be,

2. to inventory and assess the capacity, efficiency and effectiveness of present educational institutions and programs,
3. to indicate failures or weaknesses in the existing programs and institutions,
4. to assess alternative actions for improving learning,
5. to evaluate and to assist in the design of new programs or policies,
6. to guide in the allocation of funds between and within existing institutions and between old and innovative programs,
7. to allocate educational manpower and other resources throughout the nation,
8. to clarify education's optimal share of the nation's resources,
9. to delineate the responsibilities of education and the areas in which intervention by other ministries or agencies would be more effective,
10. to establish a basis for performance incentives for students, teachers, administrators, union, other providers,
11. to justify requests for new material or external funding when indicated, and
12. to facilitate assessment of planned variations in programs or projects.

Implications Of Various Outcome Measurements For Policy Use

The methodologies available for the different kinds of analysis and evaluation vary enormously: input-output analysis, cost-benefit analysis, firsthand reports by students, teachers, educational inspectors, and so forth. Each has a different purpose. All, however, are only as good as the outcome measures they employ to capture the specified effectiveness of the objectives of the strategy, program or development project.

When most education was evaluated in terms of the inputs--teacher training and experience, per capita expenditures on students, classroom size, pupil/teacher ratios--the assumption was that a lower pupil/teacher ratio, more money spent per student, longer teacher training, produced better students.

The call for more analytical assessment of programs and for accountability and evaluation necessitated some examination of outcomes. The choices of outcome indicators can play a very decisive part in shaping policy, since they are often the basis for decisions. No developing country has the financial resources nor the trained social scientists to engage in anything but very limited and carefully chosen analysis and evaluation. The routine collection of data relevant to educational planning may in itself be one of the development goals. Until this is established, policy makers will have to rely on existing information, perhaps devising new ways to use it. Some educationally related phenomena are so complex that no amount of data will convey the entire picture directly. Thus, useful proxies must be selected.

Planning for Education: A Developing Art

Educational planning is still a developing art. This is especially the case in the developing countries where data limitations are often severe, and developmental goals in general and educational goals in particular are not clearly defined. Social and political pressures everywhere make difficult a rational approach to educational development. Nevertheless, over the past two decades most developing countries have engaged in some planning for education, in a number of cases only on a very limited basis.

A review of nationwide educational planning in those countries leads to the tentative conclusion that the most sophisticated planning process will not lead to plan acceptance and implementation without firm commitment of political leaders and effective cooperation from competent administrators. On the other hand, the crudest processes and plans may be successfully implemented if government leaders support planning, participate in its processes, and view it as essential to the development scheme. Most educational planning in the developing countries falls somewhere between these two extremes.

Over the past two decades, the struggle for economic development has replaced the struggle for political independence. As government leaders have looked more and more to education as a cornerstone in development, modernization, and nation building, and as problems of financing educational costs have become more severe, a rational approach to educational development has gained wider acceptance.

Limited data and output measures now available after the first decades of planning in the developing countries point to a need for more adequate measurement methods. This chapter briefly reviews educational planning as a background for the subsequent formulation of concepts of outcome measures and discussion of those concepts. Better measures will have ramifications for educational goal setting as well as for planning for the achievement of those goals.

Variations exist among developing nations in types of education problems faced, educational objectives, and in approaches to problem solving. Many nations find their "inherited" educational system ill-adapted for the challenges of growth and development. Among the general complaints of those nations are that existing education tends to be more academic than practical, more elitist than mass-based, more urban-oriented than rural. Existing education systems are also criticized for accentuating the inequality between regions, races, tribes, and religious groups.

Constraints Faced By Planners

Educational planning often is a part of overall development planning and frequently is combined with manpower planning. At the same time, educational resources are devoted to spreading literacy and to influencing social, political and cultural attitudes. While planning itself is a rational process, it often operates within the limitations of tradition, broad formulations of historic goals, set budgets, fixed overall development plans, and sometimes conflicting political and social interests.

Trends In Planning

When most developing countries began planning for education, the world community's emphasis was on expanding systems and increasing enrollments to provide the skilled manpower for economic growth. As a consequence, methods of forecasting and statistical collections were developed for that purpose. As educational and manpower plans were coordinated, educational planning data and methods developed along with manpower data and techniques. Yet the educational systems remained basically unchanged.

The trend in planning is now shifting away from a primarily linear expansion approach (often referred to as a quantitative approach). That trend reflects changing views of the role of education in the developing countries. Planners are turning more and more to a search for better use of existing resource commitments, for the capacity to plan for basic changes in the educational system itself: curriculum changes, improved implementation and management, innovations in teaching methods (often described as the qualitative approach). This is buttressed by experience showing that traditional European education is not necessarily appropriate education for LDCs. Other trends include new emphasis on education for rural and agricultural as well as for modern and urban development, and incorporating into planning all types of education: nonformal and private as well as formal, traditional, and public. Problems of the holding power of the educational system, improved teaching methods, and more and better qualified teachers gain new emphasis. Hand in hand with the more realistic appraisal of problems of education is a reinforced awareness that education (whether knowledge, skill or attitudes) cannot by itself bring about transformations in a nation--that, for example, rural and agricultural development problems cannot be solved by education alone. Instead, there must be simultaneous changes in the environment. The best educational system cannot keep rural residents in rural areas unless the environment is as desirable and attractive as other areas, particularly the city. Educational planners, therefore, increasingly aware of the limitations of the role of education in a nation's overall development, seem to be taking a new look at their art.

Furthermore, planning for education in the developing countries today reflects not only the worldwide ferment of reappraisal of educational systems and their role in society but also unique problems resulting from more than a decade of education explosion. As education expanded rapidly, costs soared, increasing faster than national revenues. Leaders and planners now face imbalances and bottlenecks within the system, demands for education still unsatisfied, high rates of unemployment among school leavers and graduates, and educational systems that are often not responsive to either the needs of students or of society.

The Planning Process

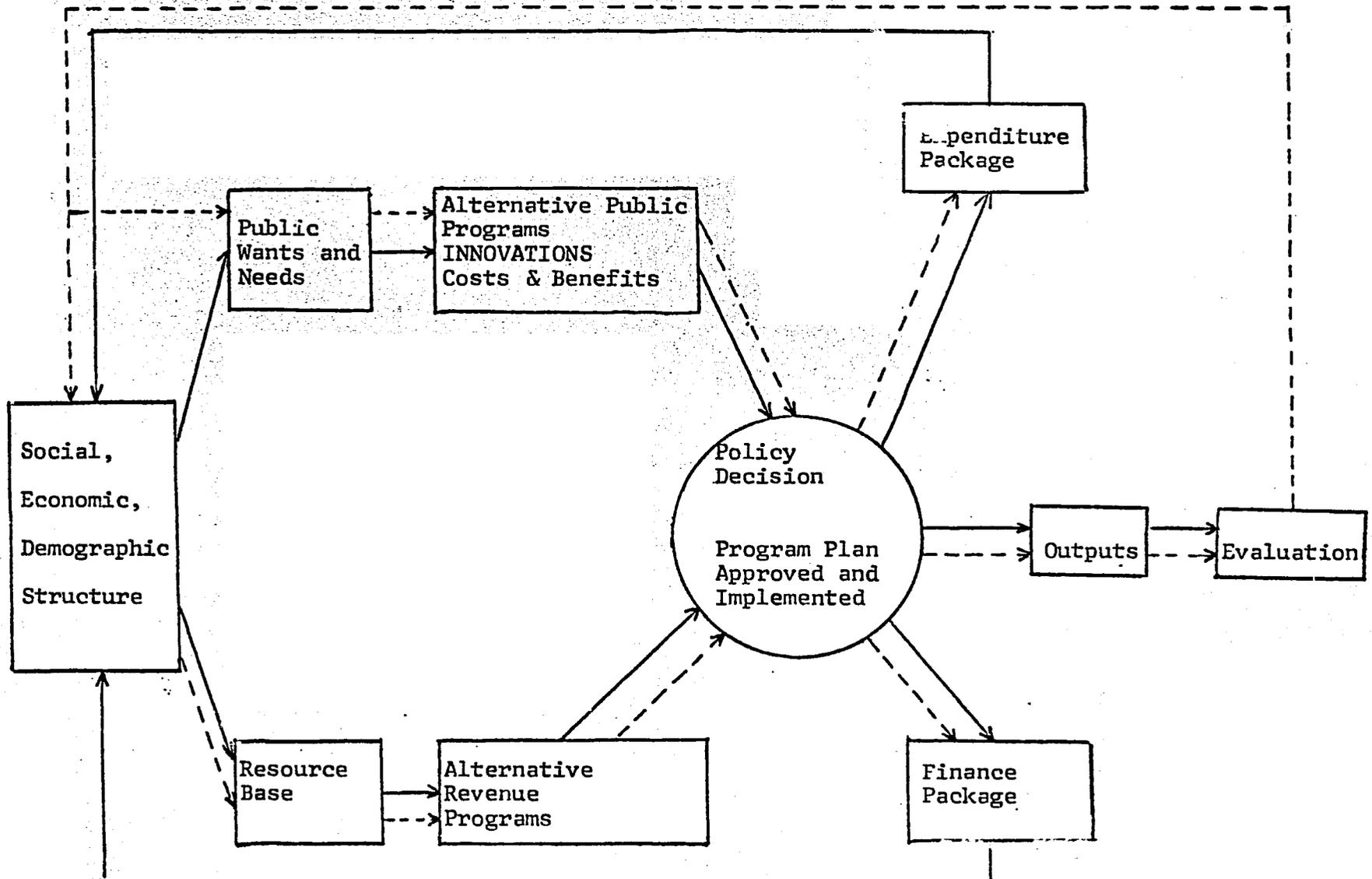
A variety of phases and levels of activity are involved in the operation of an effective system for decisionmaking (see Exhibit 1). Such a system calls for all activities to be undertaken as parts of the same system, not as a series of unconnected functions. Separate pursuit of opposing or differing program purposes will not only lead to inconsistency but may defeat the objectives being pursued.

In the planning stage, this is especially true. Most planning efforts have vital implications for each other. If educational planning is part of the overall planning process, it is more likely that goals would be clarified and conflicts handled on the idea level rather than after decisions have hardened.

No two planning agencies follow the same procedures; no two countries' plans are alike. But similar planning steps and methods are utilized, depending in large part on the scope and range of the plan, on the experience of the planners and on the availability of data.

Exhibit 1.

A Schematic Presentation of Activities in Rational Public Decision Making



Educational planning involves a systematic statement of objectives, a formulation of criteria for assessing the progress toward those objectives, the generation of optional ways of achieving those objectives and an analysis of those alternative ways, including assessment of the most efficient use of resources. It usually also involves coordinating the development of education with overall economic and social development. Ideally, educational planning is a continuous process. Once the plan is drawn up, the process is concerned with implementation and administration, evaluation of educational system outputs, and feedback and revision of goals and plans. In the evaluation and feedback process, measures of educational output become a new input into planning. (Exhibit 1).

Thus, no educational plan can be accepted as the final judgment on the future of education in any one country. This problem seems to be more often recognized by planners than by administrators who are often confronted with deadlines of five-year plans.

It is generally agreed that no matter how carefully a plan is prepared and how many factors and details are taken into consideration, the educational planner cannot assume that matters will work out in strict accordance with his plan; they almost certainly will not, and by the time the new programs are underway, the system may look very different from the original plan. The administrator or the person who is in charge of implementing the plan needs to bear in mind that an educational plan must constantly be amended and sometimes overhauled. Plans are implemented essentially where the job is done. In

some cases, the planner himself may be involved again in the implementation stage because of the shortage of manpower in the developing countries.

This problem has been encountered in educational planning in Tanzania where it was emphasized that the administrative procedures needed for plan implementation must be carefully planned to coincide with the availability of funds or the supply of teachers.

Also, a point sometimes forgotten when considering the division of labor and responsibilities is the role to be assigned to non-government schools such as Church schools, mission and private schools which should also be included in the plans. This has been rather difficult in the developing countries because of the lack of information about the role which private or non-government educational institutions can and will play in future educational development.

Procedures used in educational planning include:

Diagnosis--a needs assessment of the present situation and future trends of education in the context of the overall social and economic development plan (or a more specific project) with a view to developing strategies to reach certain goals. Much of the earliest planning involved processes largely designed with a view to future developments without regard to resource constraints that set the bounds for decision. "Diagnosis" is in effect just the first step of the process and identifies problems, their scope and significance. To relate planning to action calls for identification of implications of planning activities and assessment of the range of choices in the light of resource constraints.

Systems analysis--education and its goals are rationally viewed as a complete process which is related to the overall development

process and other subsystems. Techniques of analytical approaches include: input-output analysis (showing relations of means to ends), operations research, cost-benefit analysis (attempting to show economic results of proposed educational policies), and cost-effectiveness analysis (comparing cost and gain of proposed policies and strategies to help decision-makers choose among alternative courses of action).

Systems analysis essentially involves a reduction of complex problems into their component segments so that each segment can be studied separately. Questions of fact can be subjected through this process to the test of observed experience. Those aspects of the problem that involve value judgments can be separately identified and the basis of judgment made explicit. The system allows itself to be continuously changed and corrected in light of experience.

The basic elements of analysis are presented below:

- a clear definition of the problem(s).
- identification of the basic governmental objectives involved.
- selection of criteria or measures of "effectiveness" which will permit estimation of progress toward the basic governmental objectives. These are not limited only to quantifiable criteria.
- identification and description of the key features of the alternative ways of attempting to solve the problem(s).
- estimates of the full-cost implications of each alternative, including future as well as immediate implications.
- a clear presentation of the "tradeoffs" among the alternatives considering the costs and effects.

- identification of the major uncertainties, and the quantification of the uncertainties, to the extent possible. The effects of these uncertainties on the potential decisions should be estimated, if possible.
- identification of the major assumptions made in the study with an indication of the degree to which program choices may be sensitive to these assumptions.
- documentation to permit others to understand and evaluate what was done in the analysis and to obtain a feeling for how accurate the basic data and the findings are.

Although systems analysis may use, if applicable, many of the techniques of mathematics, operations research, and economics, it may require no more technical sophistication than the pulling together of already existing data in a meaningful and informative way.

Analytical procedures go on continuously--with varying degrees of intensity or "rigor," and with a wide range in their scope of inquiry and the number of agencies involved. Their essential purpose is to appraise and test the effectiveness of resource allocations, actual or proposed. An additional value of these procedures is the contribution they can make to improvements within the programs examined.

Analyses are concerned with (1) programming for governmental objectives, and (2) a summary assessment of the progress made toward development goals. The same type of analytical procedures will come into play for both types of analyses.

It should be noted that an educational plan at a national level serves more or less as a blueprint for detailed planning at a lower level.

Systems analysis in educational planning at one stage calls for listing objectives in terms of desired outcomes and in terms of skills needed. It is even more useful to spell out behavior which is evidence of skill attainment. This provides for more effective assessment.

Evaluation--Evaluation is the process of assessing how effectively a program is achieving its objectives. It focuses on output rather than input; one of its basic functions is to provide feedback from results to planning. Evaluation findings can provide direction for policy makers for changing current operations, and for planning future programs.

Evaluation differs little from analysis in methodology and processes but there are differences which may be identified in terms of three characteristics. First, analysis is a predecision process of examination; evaluation is an examination after the fact, but nevertheless looking to changes in program and project that can achieve the results more surely or at lower costs. Second, analysis calls for a generation of options to be assessed; evaluation starts with the program or project given and seeks out options only after the assessment has been made. In a sense, evaluations are post-program audits of achievements made, tested against those expected from an earlier program analysis. Finally, analysis often requires generation of estimates of cost and outcome from a shallow base of experience; evaluations start with a body of experience from which data can be extracted. Processes of objectives determination, of design of criteria of measurement, of quantification

of costs and gains are similar in other respects.

Evaluation may consist of assessment of the effectiveness of (1) an overall program in meeting its objectives, (2) techniques used in a program, or (3) individual projects.

Manpower Requirements Approach

The manpower requirements approach which involves forecasting manpower needs has dominated or heavily influenced educational planning in the developing nations for a number of years. It has been pointed out that this approach is popular among education planners for a number of reasons: necessary data are more readily available than the data required for a cost-benefit approach; it appears straightforward and exact; and results can be immediately understood by administrators, policy makers, and the public.

Planners are taking a fresh look at this manpower approach. Manpower forecasting, which leaves educational planning with few choices, may lead to an overly rigid view of the capacity of the economic system to absorb educated people into employment. It has also been a factor in the too rapid expansion of secondary and higher education. Furthermore, forecasts looking ahead for 5 to 10 years have frequently been wrong.

Manpower forecasting is not an easy task in less developed economies where the data base is shaky. It is even harder to forecast employment, particularly by sectors. It is difficult to account for likely changes in productivity, factor mix, etc. and their effects on employment levels during projected periods. Occupational structure is highly mobile. Further, the conversion of occupation into educational equivalents assumes a stable relationship between occupation and education over the

plan period which often does not exist.

Systems analysis, in spite of its limitations when applied in the developing world, has been increasingly used in educational planning. It provides a helpful framework for looking at consequences of various educational policies and for examining costs of education in relation to gains, including earnings of educated manpower. Techniques of cost analysis have improved over the past 10 years but in many countries are still rude and elementary; techniques of effectiveness wait on "outputs."

Analysis of costs of education in relation to quantifiable objectives has potential for assessing how effectively resources are used and how they could be used more effectively. With educational expenditures in many LDC's reaching one-fifth of the national budget, there is need to reduce unit costs if enrollments are to continue to increase. To halt steadily rising unit costs, emphasis may have to shift to analysis of cost; and educational innovation and reforms--adapting new teaching methods and curricula, etc.--may become the most important tools of the planner.

A Sampling Of The Use Of Systems Analysis

The IIEP has gathered 27 case studies on the use of analysis in educational planning in the developing nations. ^{1/} These studies provide examples of the use of analysis in testing feasibility of plans for expansion of education, costing educational reforms and innovations, and comparing returns from investment in physical capital with that from investment in secondary and higher education.

Highlights of some of the case studies include:

Tanzania--in spite of limited data, a cost analysis was developed and was used in preparing the 1964-69 development plan for education. Leaders, educators and economic authorities implemented the plan. (No evaluation has been made.)

Ceylon--in preparing the 1966-70 educational plan, a cost analysis showed that it would be financially infeasible to rapidly increase the primary school participation rate to 90 percent.

Thailand--an analysis was made prior to drawing up the formulation of the education sector of the National Economic and Social Development Plan for 1967-71. After targets were set, planners, with Unesco assistance, were able, in spite of data shortcomings, to test the feasibility and show problems and modifications needed in the plan.

^{1/} Summaries and analyses included in Philip H. Coombs and Jacques Hallak. Managing Educational Costs. New York: Oxford University Press, 1972.

Ivory Coast--with Unesco help, a cost analysis and feasibility study of the proposed program of massive use of TV in primary schools was conducted.

Madagascar--planners, using crude methods and data, were able to complete a study of cost implications of changing secondary school curricula; it reportedly had an impact on government policy.

India--one study attempted to analyze causes of unemployment among university and secondary school graduates and dealt with estimating rates of return to educational investment. Two other analyses dealt with the issue of resource allocation and the rate of return on education compared with investment in other capital (the studies showed that the rate of return from investment in physical capital was higher than economic returns from secondary and higher education).

Colombia--a cost-benefit study found the highest rate of return from secondary education, the next highest from primary education, and extremely low returns from higher education. No comparison was made with returns elsewhere in the economy.

Uganda--the second five year educational plan (to be set within the framework of the overall development plan at the outset) held down primary enrollments so no expansion of teacher supply was necessary for enrollment targets. Rough costing showed this would exceed the resource limit of the plan, so another plan to cut unit costs was drawn up. The government considered this too minimal to satisfy practical needs and the nation's aspirations. A further alternative plan was then formulated and costed.

Morocco--a fact finding study of capital costs and recurrent costs of secondary schools faced limited and inadequate data. A cross-section sample was then developed.

Chile--another fact-finding study on number and size of classes in secondary technical school, and on numbers of teachers and how they were spending their time showed the need for better management and use of available resources, not more funds.

Educational Planning Reviewed

A review of educational planning by Unesco in the latter part of the 1960's showed that 80 of 98 countries surveyed had drawn up educational plans.^{2/} But 11 of those plans were not approved and three plans, after approval, were not put into operation. Eighty-six of the countries had plans for economic and social development; in 70 cases, educational planning was part of the development plan. In all countries, primary and secondary school levels were included in the plan. A number of countries' plans included technical and vocational training; fewer included agricultural training at the secondary level; and many included higher education. While only 59 countries included qualitative aspects of planning (yield, structure, content of education), most others were in the process of developing those qualitative aspects. Sixty-five plans were drawn up after an investigation of manpower needs.

^{2/} Unesco, Educational Planning: A World Survey of Problems and Prospects. Paris, Unesco, 1970.

Eighty-five percent of the countries questioned had an administrative authority responsible for educational planning. The planning organization was located in various ministries or agencies of government. Some had permanent planning units, others ad hoc. The planning unit might deal only with quantitative aspects of planning or it might coordinate programs of various departments to include all aspects of educational planning.

The survey showed that targets of various regions were not generally met in Asia and Africa. Although the study was not precise about Latin America, it appeared targets were more nearly met there. But it was in the "qualitative" field that failings of planning were most apparent. Among revealed problems of education in the LDCs were high wastage and retardation rates; abnormal overloading of classes as enrollments increased; teachers not qualified for the level of teaching; educational and curriculum reforms not enacted; imbalance between manpower employment needs and training. The survey stressed that the problems could not be blamed on planning. Nevertheless, 10 years of planning has not solved problems.

Not the least of the planner's problems are the fragmentary nature and inaccuracy of available data. Also, there may be difficulty reconciling development goals, social demand, and political needs as they focus on education.

A brief review of the development of educational planning in three continents, Africa, Asia, and Latin America, highlights the growth of planning and the problems encountered in the 1960's.

Africa. In spite of poorly developed administrative structures for carrying out educational plans and severe financial restraints on educational growth, a number of African countries are implementing plans. Problems facing planners include high unemployment among school leavers and differences in educational opportunity both between sexes and between rural and urban areas.

Unesco and the Economic Commission for Africa sponsored the Addis Ababa conference (1961) which set up targets for educational expansion. Before that, Ghana had made education an important part of its eight-year development plan and Morocco (1958) and Tunisia (1959) had begun implementing educational plans. A series of regional conferences took place in the 1960s. All were concerned with various aspects of educational planning: the Paris conference (1962) suggested ways to reduce costs of secondary schooling and made recommendations for better planning and organizations; the Tananarive conference (1962) dealt with higher education; the Abidjan conference (1961) recommended that planning also cover adult literacy education and scientific research; the Nairobi conference (1968) assessed education in Africa.

Asia. Large-scale, fairly sophisticated planning has been developed in India and Pakistan. India has had a series of development

plans since 1951; Pakistan since 1958. But in both nations the direction of the plan has been much influenced by social and political pressures and demands. In India, for example, rapid increase in the number of educated persons resulted not so much from planned targets based on estimated projection of demand but essentially from a larger base of the educational system because of pressures from groups all over India, especially women. Burma and Ceylon, too, began laying out plans in the late 1950's. Their plans were geared toward reduction of primary school wastage and relating education more closely to industrial and manpower needs.

Again, a series of Unesco-sponsored regional conferences were held to stimulate Asian nation's use of planning. The Karachi conference and plan (1960), endorsed by 17 Asian nations, dealt with primary education and set a goal of seven years of free compulsory education by 1980; the Tokyo conference (1962) reviewed problems of the Karachi plan and studied development of private education in the framework of general education planning and social and economic planning; the Bangkok conference (1965) adopted a draft model for Asian educational development for the period 1965-1980.

Latin America. Most nations have established planning organizations and plans have been developed, but there is difficulty implementing those plans. Political instability, adherence to the status quo within the educational system itself, and inefficient administrative structures have been cited as basic reasons for ineffectiveness of plan implementation. In many instances, planning for education has not been coordinated with general development plans. In Venezuela,

El Salvador, and Uruguay, however, educational plans are concerned with employment needs and development targets. Latin American countries are faced with such rapid population growth that education has to expand just to stay even with the birth rate. Approved educational plans are usually conservative and planners are more inclined to accept the status quo of educational systems than to deal with basic changes in the system.

Regional OAS and Unesco educational conferences have been held to establish quantitative targets with recommendations for increasing technical, scientific and vocational offerings: in 1958, an inter-American seminar looked at problems of organization and methods of educational planning, administration, and finance; in 1962, the Santiago de Chile conference studied relations between education and economic, social, and demographic conditions in Latin America and defined objectives of a 10-year plan for educational development; in 1966, the Buenos Aires conference dealt with the question of content, methods, yields and evaluation of education.

Ethopian Education Sector Review

Ethiopia's Education Sector Review, issued in August 1972, presents a comprehensive review of the country's educational needs.^{3/}

^{3/} Report of the Education Sector Review: Education: Challenge to the Nation. Addis Ababa, Ethiopia, August 1972.

It sets forth educational objectives in the context of overall national goals and makes basic proposals for all aspects of education along with projected financial resources. The general objective in the review according to which alternative strategies were calculated was to achieve universal primary education in Ethiopia by the year 2000. Three different strategies were formulated in order to achieve this objective, and the participants of the review conference agreed on a combination of two of the strategies. This illustrates one step in the systems approach: to consider different alternatives and accept the most appropriate method.

It is interesting to note that reorienting attitudes was one of the points recommended by the Education Sector Review Conference in Ethiopia. "Perhaps the greatest challenge in implementing the recommendations of the Sector Review - or any other far-reaching change in the nation's educational system - would be the need to reorient the attitudes of the people of the nation toward the purposes of education. ...the recommended system would provide a self-contained program at each level that would be terminal for most students. Its adoption would require recognition and acceptance of this by pupils, parents, teachers, educational administrators, and people from all facets of Ethiopian society."^{4/}

^{4/} Ibid., VII-4.

The Issues Analysis Process

Analysis is essential questioning--questioning progress in terms of purpose: Did the expenditures result in the product that was desired? Analysis is planning tool for assessment of segments of overall national plans for development--a segment at a time in response to identified issues and currently pressing problems.

Conclusion

Although good planning does not by itself necessarily lead to an effective educational system, it is difficult if not impossible to achieve an effective system without some planning and analysis.

Continual assessment through measurement of outputs is a very important part of the planning process. It is a means of discovering strengths and weaknesses of programs and operations and is a source of data for the evaluation that makes planning a continuing process of improving decisionmaking, programming, and administration.

ADDENDUM I, CHAPTER II

PLANNING, PROGRAMMING AND BUDGETING SYSTEM (PPBS)

IN EDUCATIONAL PLANNING--AN OVERVIEW

PPBS Defined

Planning of any type is often described as involving a logical sequence of activities of goal setting, evaluating of alternative means of attaining goals, implementation of programs and evaluation of outcomes in relation to goals and means. PPBS is a similar formulation of the planning problem and process, which aims at faithfully and rigorously applying methods and techniques for carrying out these activities.

PPBS is yet in its infancy as far as its use is concerned. It may even be unheard of in planning circles in some developing countries. Only a few comments are made here on its main features and the possibilities that it offers to educational planning in developing countries.

Central Elements of PPBS

The elements of PPBS briefly discussed here are those which pertain to the formulation of objectives, the design of programs, and the use of the method of program budgeting.

(a) Specification of Objectives

The beginning and important point of the approach of PPBS is the specification of objectives. This may appear to some to be a relatively

simple matter. It has been shown, however, that the determination of institutional objectives can be extremely difficult, since officials often provide differing views about the objectives of their institution. Under these circumstances, conflicts often arise among officials about the fundamental purpose or raison d'etre of institutions of which they are a part.

(b) Design of Programs

The translation of objectives into programs constitutes a major function of planning. Once agreement is reached on objectives, commitment to those objectives can be demonstrated in part by how well they are translated into actual programs and budgets. The link between objectives and programs is demonstrated by the following example of a program structure of a state Department of Education in the United States, which reads as follows:

- "0 Provide general support of school districts.
 - Support for current operations.
 - Support for facilities acquisition.
- 0 Equalize educational capability of school districts.
- 0 Support special programs
 - Designated categories of students.
 - Designated programs.
- 0 Provide central educational services.
- 0 Provide central administrative services.
- 0 Support educational research and development.
- 0 Coordinate Federal programs.
- 0 Administration." 1/

The PPBS approach appropriately lays major emphasis on program choice. Specific techniques and tools of analysis often used in systems

1/ Levine, Donald M. et al., "A Symposium of Educational Planning and Program Budgeting: An Analysis of Implementation Strategy," Paper presented to the American Educational Research Association, 1971, p. 5.

analysis are rigorously applied in this stage of planning. Based on such analyses, a program or programs are selected which would most optimally meet the specified objectives.

(c) Program Budgeting

Another outstanding feature of PPBS is the use of the method of program budgeting. Traditionally, budgets are elaborated according to more or less standard types of expenditure categories such as salaries, equipment, travel, etc. The program budgeting approach allocates budgets to defined programs and not according to conventional line items.

Assume for instance that a program is formulated for the development of a Faculty of Medicine in a given University. Ordinarily, only direct costs classified in standard accounting categories would be charged to that Faculty. If program budgeting were adopted, the true cost of the program could be reflected by charging to it, for instance, the cost of teaching done by other Faculties to students of the Faculty and other costs of the overhead type. The costs could also be broken down into subcategories of the program of the Faculty. Such a system permits the development of a valid cost per student for that Faculty which is valuable in educational planning. More insights can, however, be gained by the use of program budgeting in a University.

Prospects and Problems in the Application of PPBS

Needless to say, difficulties arise in the attempt to implement PPBS. Some of the difficulties that are encountered, however, would largely amount to bringing to the surface fundamental issues which should in any case be faced head-on if serious planning were desired.

In developing countries, major educational policies may be made on the basis of economic, social, political and pedagogic considerations. Hardly more needs to be said about the likely conflicts that could conceivably arise in such circumstances. Though it may be difficult to arrive at specific and measurable objectives, open discussion and debate on objectives may provide a foothold to a more disciplined social process in dealing with matters of great national concern in the developing countries.

As indicated above, however, a great benefit of the PPB approach of program development is the linkage and consistency maintained with objectives. In developing countries, planning often suffers not only because of weakness in the clarity of objectives, but also because little is done in the way of systematic and deliberate attempt to relate investments with objectives. Admittedly, difficulties related to the quantitative analysis that would have to be made as the basis for the selection of programs would not be easy to surmount because of the limitations of data as well as technical capability.

If programs were analytically linked with objectives and program budgeting were achieved, there is hardly any question about the benefits that would accrue particularly in the efficiency and effectiveness of resource use.

The conventional budgetary procedure often consists of an annual rehearsal of submission, review, and cuts in the catalog of line budget items. Decisions are often unduly influenced by ingeniously worked out budget justifications, commitments of one type or another that must be met, and items considered "priorities" though often without real analysis of available alternatives. The approach of program budgeting

may, therefore, have great appeal to planners who are often the most concerned about the efficiency in the use of limited national resources.

Is an adoption of only some of the elements of PPBS possible? Some proponents of the system answer in the affirmative. A recent recommendation for the adoption of program budgeting by the Ministry of Education of Ethiopia is presented as follows:

"It is recommended that the Ministry of Education and Fine Arts begin an unsophisticated form of programme budget. The programme budget would provide information for decision-making. It would be compatible with the present accounting/budgeting procedure, and would supplement, not replace, the present system. Some of the details of the programme budget are suggested, but it is recommended that the operating departments modify these in light of their needs and in light of the information available." 2/

In this connection, however, it has been said that bias toward one or another of the elements constitutes a major weakness in the implementation of PPBS. When bias occurs toward the budgetary feature of PPBS, little more than an analysis of what would serve as the justification of a budget results. Orientation toward objectives would result in a resolution of conflicts that may arise by the statement of objectives which are too general for effective application of PPBS. A literal acceptance of PPBS as an "integrated" system calling for the use of various techniques and the concomitant bias toward the compilation of information can lead to a costly exercise which does not optimally and effectively serve decision-making.

2/ "Programme Budgeting. A Suggestion for Improving the Ministry's Budgeting Procedure," Planning and Programming Office, Ministry of Education & Fine Arts, 1972, cover page.

Effective implementation of PPBS according to this view calls for a "balanced approach." This, however, does not mean that PPBS has to be applied over the entire educational planning system.

Take, for instance, the case of an institution such as HSIU, which receives annually a lump-sum "grant-in-aid" for operations from the government, as contrasted with line-item budgets received by most other agencies. It is possible for such an institution to adopt PPBS even though all other educational agencies continue to operate in the usual ways.

The comprehensive adoption of PPBS in the educational sector in developing countries can realistically be a long-term aim, however. Successful implementation of the system by some institutions in developing countries can certainly serve as an impetus for its wider adoption.

ADDENDUM II, CHAPTER II

A BRIEF REVIEW OF THE LITERATURE ON BENEFIT-COST ANALYSIS AND MANPOWER APPROACH TO EDUCATIONAL PLANNING IN DEVELOPING COUNTRIES

In the growing body of literature on educational planning, the use of benefit-cost analysis and the manpower approach both receive considerable attention. In the following pages, a brief discussion of the theory and techniques of each method is presented along with examples from selected studies. The discussion focuses on the developing countries and literature selections are based in part on relevance to and concern with that part of the world.

I. The Benefit-Cost Method in Educational Planning

The benefit-cost approach is not a planning method as such. It is a calculation technique used for purposes of investment selection. We can think of a spectrum of investments (including investment in education) arranged according to profitability rates to choose from. Assuming other things equal, an investment with relatively higher yield would be preferred to an investment with relatively lower returns. Benefit-cost ratios (usually a ratio of discounted future benefits of an investment to its discounted costs), present net value of investment calculations (where discounted costs are subtracted from the value of discounted benefits), as well as rate-of-return calculations are used

for such decision making purposes. Of these, the rate-of-return method is widely used for measuring yield rates from education.

The technique of rate-of-return calculation is rather simple. To calculate the benefits from (a particular type and/or level of)^{1/} education, estimates are usually made of the incomes from (that type and/or level of) education over the working lifetime of the average individual. Because a given dollar income in the future is less than the same dollar income today, the streams of income are discounted.

In the calculation of costs as well as benefits, it would be useful to differentiate between social and private costs and benefits (4, 12, 22, 26). In general, social costs (total costs accruing to society) would include direct costs such as teachers' salaries, rents (imputed), etc., as well as incomes foregone by individuals remaining in school, whereas private costs may include all these less public subsidies (e.g., free tuition and fees, scholarships, etc.). On the benefit side, the usual practice is to define private benefits as gross incomes less taxes and to approximate social benefits by gross incomes. Obviously, such distinctions imply disparity between social rate-of-return and private rate-of-return. Nonetheless, the distinction is important since public decisions on educational investment are more likely to be influenced by the social calculus than by private.

To date, rate of return calculations from education are available for many countries, including a number of developing ones, including

^{1/} The type of education refers to the kinds of curriculum inputs of education, e.g., science, arts, etc. and the level refers to years of schooling, e.g., elementary, secondary, etc.

Chile (7), Mexico (8), India (11), Malaysia (13), Ethiopia (17), Colombia (21), Uganda (24), and others (21, 26).

A review of literature (1, 5, 6, 18, 20, 26) further attests to the popularity of the technique. Equally obvious are controversies over the utility of rate-of-return calculations as possible guides to public policy in the education field (4, 5, 15, 25, 27).

One major weakness in rate-of-return calculations is that educational outputs are narrowly defined. All the known studies consider the economic or monetary returns from education (4, 5, 12, 26). Earning differentials observed for different educational experiences are the usual proxy measurements for such returns. It is doubtful that such earnings differentials can measure the full range of monetary benefits of education. It would be even more doubtful to use earnings as a proxy for "all benefits" generated by education. The rationale for education are many. These may include belief in education as a key factor in economic development, the desire to have nationals possessing required skills, interest in the development of national research capabilities, etc. Expected educational outcomes may not be reflected in income differentials between individuals possessing different types and levels of education. The benefits from education have temporal and spatial dimensions (25) and any attempt at identification of educational outcomes, while recommendable, is unlikely to yield comprehensive measurements (25). In the case of less developed economies, there are the unique psychological, political and other positive linked impacts of education which are certainly not included in rate-of-return calculations. The exclusion of all these "non-economic"

(called in the literature externalities) effects of education from rate-of-return calculations may well mean to ignore the more important justifications for education.

Even considering the narrow definition for educational benefits (measured by earnings) only opens up new problem areas in the exercise of educational output identification and measurement. A requirement for the approximation of educational benefits by earnings' differentials to work is that wages paid to individuals closely correspond to marginal productivity of labor. But market imperfections (particularly in less developed economies) may suggest (especially in public sector employment) disparity between earnings and marginal productivity. There is little utility from the exercise unless wages earned reflect productive contributions made by labor to the economy.

It is also unwise to accept the implied proposition in many rate-of-return calculations that wage differentials are solely caused by educational differences. Family connections, ethnic backgrounds, proximity to work places, etc. are assumed to have considerable influence on earnings. The adjustment of income differentials for some such factors (to isolate the pure effects of education) in less developed economies is difficult because of lacking data. Where attempts are made to use results from other countries, doubts are further cast over the international comparability of such adjustment factors (4, 23, 26).

Another shortcoming of rate-of-return calculations stems from the use of cross-section data. Rates-of-return from education are usually calculated using cross-section data. How useful are such calculations

for purposes of guiding future policies in the education field? Rate-of-return calculations may have predictive merits, other things being equal, if income and cost levels and related differentials (i.e., wage and cost structures) remained stable in the future (i.e., plan period). But it is hard to accept stability of the kind in less developed economies where changes are taking place all the time. Substitution of expatriate staff by nationals in schools and universities is likely to reduce costs of education. On the other hand, shifts in emphasis from arts and humanities to sciences and technology are likely to raise costs and hence tend to reduce rate-of-return over cost in education. An opposite effect is likely with a substitution of western educational management practices by Socialist approaches in poor countries. Likewise, growing urban unemployment in many poor countries are likely to reduce future earnings of school and university leavers, i.e., reduce the rate-of-return from education. It is thus reasonable to assume shifts in cost and earning structures. There may be cancelling effects in such shifts, but the net results are unknown. It is also reasonable to assume that the longer the plan period (i.e., the period for which calculated rate-of-return apply) the less useful are rate-of-return calculations as guides to educational policy.

Another problem relates to interpretation of rate-of-return calculations. The calculated single value results are poor guides to public policy and call for caution in their interpretations. What are the policy implications, for example, of a lower social rate-of-return in university than secondary education? All known studies in less developed economies (have the bad habit to) yield such results (e.g.,

3, 7, 8-10, 9, 11, 13, 17, 21, 26). In some cases, such results are advanced in support of a shift of resources toward levels and types of education with better yields (e.g., 7, 13, 17). But the same results may be used for different policy suggestions. For example, a recent Planning Commission paper in Ethiopia (17) concludes, "The social return to university degrees is sufficiently low to suggest a sharp immediate curtailment in expansion rates." But an examination of the state of higher education in the country shows clearly the existence of a lumpy fixed cost situation at the same time--expensive infrastructure (mainly buildings), purchase of equipments for new faculties, etc. Obviously then, increasing enrollment (and/or efficient management aimed at cost reduction) is likely to reduce costs per student and hence improve the returns from university education. Note, however, the recommendation to increase enrollment is a direct contradiction of the suggestion to curtail expansion. Yet the same rate of return calculus may be used to advance either case.

II. Manpower Requirements Approach

Developments in the education sector in many less developed economies have shown clearly the failings of the "inherited educational systems." On the inputs side, large proportions of GNP are channeled to finance education. The average student requires about 10 years to go through the process of the educational system in order to arrive at the door steps of "third level" institutions (and this happens in countries where the average life expectancy is not more than 40 years). Human and other material resources too are committed to the educational effort. Yet, despite the clarity with which the educational inputs

(including time, finance, human resources, curricula, etc.) can be measured, the gains from education are far from obvious. To be sure, educational outputs are hard to measure partly because of the multi-dimensional effects of education. But a number of possible educational outcomes are not difficult to see and some outcomes have cast strong doubts about the efficient performance of the education sector in many poor countries. Large numbers of school leavers are unemployed adding a new dimension to the growing urban unemployment problems of most developing nations (see references in I, also in II: 3, 10, 31). There is now an increasing evidence on the brain drain (also muscle drain to EEC for example) from less developed economies (13, 14, 18). Questions, and quite pertinent at that, are being asked: "Do what students learn in schools contribute to labor productivity?" "Are the institutions of learning providing employable skills?" "Can the total outputs of the education sector justify the large expenditures that poor nations commit to education?"

A major justification for a manpower approach to educational planning is that it is far better to base decisions regarding education on some plans rather than ad hoc. A more specific justification rests on the requirement that education in developing economies must be relevant to their struggles for economic growth and development. In other words, educational outputs must correspond to manpower specifications in national economic plans.

The manpower requirements approach in educational planning generally follows the following steps (see 1, 9, 25, 26, 31). First, output forecasts are made for a plan period (and usually by economic

sectors). From such output forecasts, employment forecasts can be made by assuming employment is a function of output (in some stable production function type frame). It is also possible to estimate employment by adjusting output forecasts for changes in labor productivity. A next step is the projection of occupational structure of the sectoral employment forecasts. Finally, conversion is made of occupational forecasts into educational equivalents. The education sector is then entrusted with the task of admitting and providing training for students calculated to meet the level and type required for the labor force occupational profiles during the projected period.

The manpower approach in educational planning has been tried in a number of countries, including developing ones (1, 2, 4, 17, 20, 31). The approach provides a sound frame for considering decisions regarding education, but the results achieved are mixed. The application of this method, particularly in less developed economies, where the data basis for the forecast exercises are usually shaky, has been criticized by many (7, 9, 31). There are also a number of other limitations of the approach.

Although other employment forecasting techniques are available (for example, time series analysis), the usual method is to forecast employment from some employment-output relationship frame. The existence of a stable production function for purposes of employment forecasting is questionable even for mature economies. Obviously such a relationship may exist at the firm (or factory) level. But there will be less utility to be derived from relationships of the type when the basis is an economic sector or a whole economy (even when such associations are statistically significant). Some studies made

in the industrialized West make definitive conclusions difficult partly because of diversity in variable specification (what are employment and output and how are they measured?). Apart from that, these studies indicate not only the inelasticity of employment with respect to changes in output, but also that such elasticities, as are computed, have high variances (12, 16, 29, 30, 32). The latter finding implies that the aggregate employment output relationship is unstable.

It is also equally difficult to determine a stable employment-occupation relationship. As a result, occupational forecasts could be misleading. Some studies indicate a general tendency for the enrichment of skill mix with industrialization in the sense, for example, that the proportion of "high level" occupations in the labor force for each economic sector and for the whole economy rises with industrialization (8, 9(b), 30). Other studies emphasize the sectoral shifts of employment (inherent in the industrialization process) as perhaps a primary cause for changes in the proportions of occupations in the labor force (27, 30). This is understandable since different industries, and more generally economic sectors, have differing skill requirements (6, 8, 28, 30). Nonetheless, it would be hard to take such results as sufficient guides for purposes of determining occupational structures. What is perhaps needed is a skill (occupational) requirement breakdowns by production units. Even this would not yield accurate occupation profile estimates where skill mixes (or technology) for a given production unit can vary. The rapid shifts in sectoral employment distributions taking place in less developed economies and the diverse technological and management choices open for manning a

production unit make the task of occupational forecasts that much more difficult for developing economies.

The conversion of occupations into educational equivalents is not an easy task. A primary problem is that for most occupations it is not possible to specify educational requirements (25). True, it may be possible to determine the educational inputs necessary in the case of some occupations, such as medical doctors. But for most activities, occupational substitutions are possible. Or, a given occupation can be carried out by people with different educational backgrounds. Most recent quantitative studies in this area attest to the vagueness of the association between occupation and education. These studies reveal difficulties at two levels. On the one hand, the effects of educational and occupational levels and structures of the labor force on levels of growth and development (or the other way round) are unclear (14(b), 19, 23). On the other hand, and of relevance to the point under discussion, present evidence suggests the absence of definite association between education and occupation for most occupational categories (5, 19, 23, 25). Cross-section evidence shows variations between countries in their propensity to consume education beyond the levels needed on manpower grounds (5, 19, 23). Even in any one country it is not hard to observe that a given occupation is associated with varied educational backgrounds (5).

In Ethiopia, there have been a number of attempts to use a manpower approach in educational planning. Some were criticized because of a shaky data base (see 17). A first official effort at manpower forecasting was made in the Third 5-year Development Plan, but

the sectoral employment forecasting and the conversion into educational equivalents appear to have been based upon results obtained from Cameroonian and Senegalese experiences (17). Another high level manpower forecast made failed to show methods used in forecasting (33). The only serious work based on establishment survey was made in 1970 by the Department of Labor (22). But the methods employed were strongly criticized and the resultant forecasts considered unacceptable, among others, by the Planning Commission. The various manpower forecasting exercises also yielded results marked by extreme variation. The utility of such forecasts for purposes of educational planning has been further weakened by the fact that the forecasts were mainly concerned with "high level" manpower formation. Most recently, a Planning Commission document chose to abandon the manpower approach in favor of the rate-of-return approach for purposes of education sector planning in the country (24).

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CHAPTER II, Part 2

ETHIOPIAN PERSPECTIVES ON THE SCOPE OF SYSTEMATIC EDUCATIONAL PLANNING

Development planning in the context of developing countries mirrors the process of development which involves structural alterations in the economic sphere, institutional reforms, as well as the reorientation of social systems and values. Educational planning, one facet of development planning, should be approached in a systematic way. A look at some educational plans from around the world, particularly from the developing countries, reveals that a great many of them follow a piecemeal approach to planning. Frequently, all of the components necessary for a complete plan are not taken care of, and even where they are considered, they do not follow a logical and systematic order.

Relation of Educational Planning to Development Planning

The basic premise on which the systems approach to educational planning is founded is that education should be related to a broad strategy of human-resource development rather than to a limited concept of "education" planning. Education should be related to national development plans, national political ideologies and the programs of the various agencies and organizations in the country.

The contribution that the education sector makes to the national system needs to be known. This is, of course, defined in national goals and objectives. Education is only one of the sectors among which the national resources are divided and, therefore, the education sector can only be a subsystem of the national endeavor. It cannot be divorced from a country's political philosophy nor from other agencies which contribute to manpower development. In Ethiopia, for example, the Ministry of Agriculture has two agricultural institutes at Jimma and Ambo "to train young people for work as technicians in different fields of agriculture; to prepare young men as future farmers; to train young people to become teachers in Government schools where agricultural subjects are offered; and to train farm managers and technicians for commercial farms and for commercial and national agricultural organizations."^{1/}

Similarly, the Ministry of Public Health runs schools of nursing where nurses, dressers and laboratory technicians are trained. The Ministry of Education also trains teachers for the nation's schools. These various ministerial efforts should be coordinated with the programs of the colleges of Agriculture and Public Health as well as with the programs of the Faculty of Education of the Haile Sellassie I University.

The scope of development planning has not been fully appreciated. The result has been a general failure to institutionalize planning

^{1/} Ministry of Agriculture, Ambo and Jimma Institutes of Agriculture Prospectus 1970, Addis Ababa: 1970.

as an effective instrument of development. This applies equally in the case of educational planning. The broad scope of educational planning in developing countries becomes only too obvious when one considers the aims of educational development, the size and diversity of educational systems and the short-term and long-term impact of education in such countries.

No new theory of planning is ventured here. An attempt is, however, made to describe the scope of systematic educational planning in developing countries with particular reference to Ethiopia.

Defining Educational Objectives

An essential step at the beginning is a clear statement of objectives without which there can be no systematic planning. And educational objectives are derived from national ideologies and goals. The determination of educational objectives is one of the most difficult tasks that educational planners face especially in the developing countries. There are some developing countries where national objectives have not yet been formulated, and even where formulated, some of these goals sound too philosophical and/or theoretical. There is a difference between objectives that are measurable and objectives that are value-oriented and hence cannot be measured. Unless objectives are stated in measurable terms, assessment would be very difficult. The Addis Ababa plan of 1961 called for the establishment of adequate measures for the preparation and implementation of national educational plans, for the collection of necessary statistical data and for their

periodical evaluation.^{2/} This would not be possible unless objectives were stated in measurable terms.

Thus, educational planning in developing countries of necessity should be based on the role of education in national development and on the nature of education. Attractive strategies cannot be afforded if they do not reflect national needs and if they are not derived from a realistic assessment of what education is and what it can do.^{3/}

In some cases, the stated objectives are found to be too general and need further redefinition. The following six objectives are taken from Ethiopia's Third Five-Year Plan for purposes of illustration.

1. To provide educational opportunity for an increasing number of people, particularly for the rural population.
2. To provide an educational system with a more modern scientific outlook, yet in harmony with Ethiopia's cultural traditions.
3. To acquaint youths with their country and the opportunities for participation in its development, and to develop positive attitudes for manual work and practical skills.
4. To expand the use of (national language) as a medium of national communication.

^{2/} See report of ECA-UNESCO Sponsored Conference of African States held in Addis Ababa, May 1961.

^{3/} Ross, J.G., Final Report of a Project to Assist in the Planning, Administration and Financing of Education in Ethiopia, Addis Ababa: Ministry of Education, 1973.

5. To provide a system with maximum upward mobility to the end that an ever larger proportion of youth are offered opportunities for higher education and high level training.
6. To emphasize quality education.

Objectives stated in this form can at best be general guidelines. They must be further defined and stated in specific and measurable terms. Problems that deal with distribution of educational opportunities and the proportion of youth in the different levels of education can most accurately be based on reliable population figures. No efficient planning is possible without constant reference to the present and future demographic profile of the country.^{4/}

A clearer and more measurable objective is that suggested by Ethiopia's Education Sector Review. The general objective in the review according to which strategies were calculated was to achieve universal primary education in Ethiopia by the year 2000. Three different strategies were formulated in order to achieve this objective, and the participants of the review conference agreed on a combination of two of the strategies (see below). This is one of the requirements of the systems approach, that is, to consider different alternatives and accept the most appropriate method.^{5/}

^{4/} Chau, T.N., Demographic Aspects of Educational Planning, Paris: 1969.

^{5/}

Planning Issues

Determination of the general tempo of expansion, types and mix, distribution, organization and management of education are fundamental aspects of educational planning that require decisions at the highest level of planning.

A few of the basic issues which confront planners and policy-makers on this level of planning will be briefly considered below.

1. A strategy for integrating educational development with general development. It is generally accepted that in addition to educational expansion geared to meeting national manpower requirements, the educational system serves as one of the most fundamental bases for attaining long-term national goals in developing countries. Indeed, an appreciation of the multi-functional role of education in long-term development is the keystone of planning educational development in developing countries.

2. The need to establish and insure the rightful place of education as a basic socioeconomic "institution" in the eyes of policy-makers. Concern with the preparation for a new social order should not obscure the economic and social role of education in the present. The phenomenon of education at any one time constitutes a major part of the economic life of a nation.

From the economic point of view, it is often emphasized that the education sector absorbs a large portion of limited budgetary resources at the expense of other sectors. It must be recognized, however, that the education sector is one on which other sectors depend, and one which provides employment to a relatively large portion of the population.

3. The effectiveness of educational planning. This will depend on the degree to which it can guide, support, and coordinate the variety of educational programs that invariably emerge in the process of development. There is need, to borrow Diez-Hochleitner's phrase, for a "balanced approach" in educational planning.

"...this balanced approach means that the educational process must be looked upon as a whole. One cannot indulge in the luxury of expanding a given level or aspect of education without considering its effects, the pressure it puts on the other levels, or the restrictions and limitations it imposes on the rest of the process. The whole must be taken into account. The responsibility of the planners, the policy-makers, is not limited to a given aspect of education." 6/

Developing countries can least afford duplication of effort and waste of resources. This can be minimized by a system of planning which is concerned about the entire educational system and one which aims at full utilization of resources and capacities which reveal themselves in various sectors.

4. The determination of a strategy of the mix of the various types and levels of education. The kind of strategy to be adopted will, of course, depend on the level of development and the educational needs of a nation.

Decisions on the breadth of the school curriculum is concerned with the amount of general and vocational education to be provided which in

6/ Diez-Hochleitner, R., "Policies and Practices in Educational Planning," Lecture-Discussion Series No. 10, UNESCO, IIEP/TM/10/67, p. 3.

turn depends in part on the length of time available for schooling.

The Ethiopian Education Sector Review conference used the following method in recommending a strategy by which stated objectives could be achieved. First, the desired educational systems were specified. Then the recommended strategy was to provide four years of minimum formation education, to be made available to all children as rapidly as permitted by financial constraints; two years of basic formation for youths who have been unable to attend the minimum formation program; and an extension system of non-formal educational programs for youths and adults, which would be closely related to the formal system.^{7/}

The shape of the educational pyramid reflects the distribution of the student population on the various levels of education. It is determined in part by manpower requirements, "social demand," considerations of equity and distribution of educational opportunity.

The educational strategy recommended for Ethiopia is, therefore, one of expanding the lower levels of education relatively rapidly as compared with expansion on the higher levels. This becomes more apparent when considering the massive enrollment expansion envisaged in 1999/2000.

The strategy is also concerned about the "breadth" of education. Indeed, one of the most important aspects of the debates of the Commission Conference was about the content and relevance of the existing

^{7/} Ambatcheu, Abebe, Education: Challenge to the Nation, Report of the Education Sector Review, Addis Ababa: Ministry of Education and Fine Arts, 1972 (Mimeographed).

educational system of Ethiopia.

"One function of first and second level education is to prepare a limited number of students for the next higher level. However, only a small portion go on to the next level of the formal system--and this should be recognized. Curriculum and program offerings should be restructured, with greater emphasis placed on vocational and environmentally-oriented programs which will have practical value to school leavers....

"...The Task Force on Education for National Development recommended that the concept of 'learning by doing' be entrenched by shifting emphasis from theory-oriented teaching to practical vocationally-oriented programs. The Task Force on Vocational and Technical Education recommended that the concept of comprehensive education which incorporates vocational training be included in primary and junior secondary schools as well as in senior secondary schools. The Task Force on Curriculum and Methodology developed detailed program recommendations...which are based on the rationale of furnishing a sound education foundation both for the minority who will advance to the next higher level, and the majority who will follow other opportunities.

"In accordance with the foregoing, the first level school curriculum should be modified to place greater emphasis on environmental and work-oriented studies, and particularly in rural areas on agriculture." 8/

The Commission's projections of the distribution of "formal education" for Ethiopia in 1999/2000 are in sharp contrast with the situation in 1970/71.

8/ "Report of the Education Sector Review," op. cit., P.-IV-3.

Table 1. Percentage Enrollment in 1970/71 and Projections Of Sector Review Commission to 1999/2000 Of "Formal" Education in Ethiopia. ^{9/}

	<u>Percentage Distribution in 1970/71</u>	<u>Projected Percentage Distribution in 1999/2000</u>
First Level	82.3	92.2
Second Level	17.0	7.3
Third Level	0.7	0.5

5. The organization and management of education, particularly within the government sector. This issue has two general aspects: the structure and capability of the planning hierarchy and the strength and suitability of organization and management on the various levels to support and facilitate rapid expansion of education. Experience shows that both of these aspects are given much less attention than required in developing countries. The result often is inefficiency, and an incapacity to support development and change.

On the central level, planning responsibility is often delegated to a small technical unit which has neither the personnel nor the scope and leverage to influence decisions of educational strategy and development. Planning units are frequently grafted on a system of organization and administration which is not oriented towards development. Often too, the planning function is entirely neglected on the lower levels

^{9/} Source: Adapted from "Report of the Education Sector Review," Addis Ababa, 1972, Exhibits II-B-1 and V-F-1.

and regional centers of development. Under such circumstances, planning can hardly be expected to serve effectively as an instrument of coordination of the massive development of education envisaged in most developing countries.

Obviously, the organization of educational systems as well as of planning will vary, depending on constitutional requirements, legislative systems, and the degree of autonomy of local governments. The actual structure may not be of any significant consequence. The important matter is, rather, the existence of a planning system which operates effectively at key points in the hierarchy and the orientation and responsiveness of the rest of the machinery to development.

Various Ethiopian Government Ministries either sponsor or are directly concerned with education. The Ethiopian Education Sector Review Conference also pointed out the need for a higher degree of education coordination at the Ministerial level. Formation of an Inter-Ministerial Coordinating Committee on which would be represented all ^{10/} Ministries with educational concerns and interests was proposed. Such a committee might help solve the problem of institutional and organizational inadequacies by assigning roles and dividing responsibilities among the various institutions.

6. In many countries, the educational system has approached a ceiling in terms of the budgetary resources that can be made available.

10/ Ambatchew, op. cit.

Yet, the demand for education will continue to increase. Under these circumstances, the educational planning function must include the exploration and introduction of new methods of financing education and a continuous effort to improve efficiency in the use of resources available to education.

Each country would need to adopt its own ways of financing education according to its circumstances. Failure to do so will not only hamper development but may also lead to inefficient allocation and use of whatever resources are available. For instance, because of limitations of funds, it may become an expedience to spread financial resources throughout the system largely for purposes of meeting fixed commitments such as salaries, leaving little for books, supplies, equipment, etc., which are basic requirements for effective instruction.

Requirements of Quantitative Analyses in Educational Planning

Educational planning, as planning in other spheres, requires measurement and the application of methods and techniques of analysis based on the quantification of educational and related phenomena.

It is generally believed that data of any type are difficult to obtain in developing countries. This situation is, however, changing relatively rapidly and should not be reason for failure to apply quantitative analysis in planning. The collection, organization, and reporting of statistical data is itself an aspect of institutional development and must be seen as part of the total development process.

Statistical data needed for educational planning may be internal or external to the education sector. The form in which data can be

made available partly depends on the degree of sophistication of both statistical agencies and administration of educational institutions. The data needed depend in part on the specific planning circumstances and on the ingenuity of planners in developing applicable quantitative indicators.

The types of data required may be roughly classified as educational, demographic, financial, and economic.

Educational data--basic statistical information about the inputs, processes and outputs of the educational system. This type of data consists of the numbers, distribution and patterns of success and failure of students enrolled in the educational system. It also includes the number, and level of education, of teachers and other personnel in the school system, as well as types of facilities in terms of certain indices such as numbers of classrooms, volumes of books in libraries, etc.

Demographic data--information on the number, composition, distribution and age structure of the population which is basic for the formulation of educational policy, enrollment forecasts, and estimates of necessary outlays. The techniques of demography are fairly well developed. Where complete census data are unavailable, educational planners may apply some of these techniques for the projection of changes in the population pattern. The Educational Sector Review Commission of Ethiopia, for instance, was compelled to undertake population projections on the basis of whatever limited data were available in 1972. Population growth in urban and rural sectors as well as by school age was estimated and used as the basis for projection of

enrollment to the year 2000.^{11/} Admittedly such estimates are crude and must be cautiously used. It is, however, also true that projections of population made for such a length of time into the future under better circumstances in developing countries would always be subject to a significant margin of error.

Financial data--two types of information are included. Information on recurrent finance may be budgetary estimates or actual expenditures, both of which are relevant in financial planning. These data are usable in planning if they are available by source for each level and type of education in sufficient detail, distinguishing between salary costs, supplies, library costs, etc.

Data on capital allocations and expenditures, the second type, need to be systematically recorded and reported by project and sources of financing. In this respect, it is to be noted that much investment goes on in developing countries, which may escape the attention of planners, through self-help and community contributions to education. Ways must be found by which such investments can be reported so that planners can make a fuller assessment of educational effort.

Financial data are required by planners for the purpose of evaluation of efficiency in the use of available resources and as a basis for projection of future requirements. For these purposes, it is

^{11/} "Report of the Education Sector Review," op. cit., Exhibit II-A-1.

desirable to develop and make use of indices (e.g., unit costs) based on local standards. If reliable indices are developed, the problem of projection of requirements of recurrent and capital funds can be simplified. Indeed, as the educational sector expands rapidly and becomes complex, evaluation of efficiency and the estimation of financial requirements will become unmanageable without the use of such indices.

During the Ethiopian Education Sector Review, after agreement was reached on the desired system of education, enrollment estimates were then derived. First, total funds to be made available for expenditure on education in each year were projected, and from these total allocations were first deducted for each year. Three categories of allocations were made: expenditures for higher education, mass media, and subsidies to non-government schools; costs of administration, including charges for Ministry of Education and provincial and district education offices; and non-recurrent costs, including capital funds for school construction and replacement, and one-time expenses for curriculum redesign and teacher retraining.

Similarly, the costs of first and second level education as well as cost of teacher training were calculated. Per-student costs for each year were also calculated, and the enrollment levels to be attained in first and second level schools were projected by dividing calculated per student costs into the total allocation. Estimates of the numbers to be accommodated in non-formal educational programs were determined similarly.

A system of recording and reporting financial information is a basic requirement if planners are to be able to perform quantitative

analyses and projections. As indicated above, the development of such a system is linked with general institutional development.

Economic data--information which assists in the determination of educational effort and the impact of education on economic development. The proportion of expenditures on education to total GDP, monetary GFP, total public expenditures, and tax revenues as well as per capita expenditure of education can be used to assess educational effort. International comparisons of these magnitudes are useful to determine the relative degree of effort in a given country provided that the results are carefully interpreted.

Table 2, for instances, provides indices of educational effort estimated for Ethiopia, Kenya, and Tanzania.

Manpower demand and the impact of education on economic development are extremely difficult to assess in developing countries. Nevertheless, quantitative techniques of analysis so far applied in educational planning have dealt mainly with these aspects. The types of analysis and difficulties encountered are discussed below.

Inter-temporal Coordination in Educational Planning

It is obvious that the central feature of planning is rationality in dealing with the future. Planning activities must always follow a logical order or sequence such as described in the procedure of systems analysis. This, however, is not the main reason for the need of attention to the temporal aspects of educational planning. The main reason is rather that educational development is a long-term aim which can be realized in stages and continuously. The attainment of long-term aims is possible by what can or should be done in the

Table 2. Indices of Education Effort, Ethiopia, Kenya and Tanzania, 1970-71. Also average effort for the three countries.

<u>Effort Related to GDP</u>	<u>Symbol</u>	<u>Index of Education Effort</u>			
		<u>Ethiopia</u>	<u>Kenya</u>	<u>Tanzania</u>	<u>Average</u>
Total Domestic Effort	DE	2.4	8.0	6.7	5.7
Private Effort	PE	0.2	2.5	0.3	1.0
Government Effort	GE	2.2	5.5	6.4	4.7
Allocation effort	a	19.8	21.2	32.2	24.4
Tax effort	t	11.2	26.0	19.9	19.0
<u>Effort Related to MGDP</u>					
Total Domestic Effort	DE'	4.2	10.3	9.3	7.9
Private Effort	PE'	0.4	3.2	0.4	1.3
Government Effort	GE'	3.8	7.1	8.9	6.6
Allocation effort	a'	19.8	21.2	32.2	24.4
Tax effort	t'	19.1	33.5	27.7	26.8

Notes

- (1) In the case of Kenya, government domestic revenue is defined to include revenue collected by the municipal and country councils. In the cases of Ethiopia and Tanzania, only central government revenues are considered; other governmental revenues in these countries are negligible. Government expenditures for education in all cases include expenditures by all levels of government.
- (2) DE - expenditure of domestic funds by all sectors for education expressed as a proportion of GDP.
PE - expenditure of domestic funds by the private sectors for education expressed as a proportion of GDP.
GE - expenditure of domestic funds by the government sector for education expressed as a proportion of GDP
a - proportion of government domestic revenue allocated to education.
b - proportion of GDP collected as taxes.
- (3) It is noted that a-a', for the proportion of government domestic revenue allocated to education is unrelated to either GDP or MGDP. The symbol a' is used for the sake of consistency.

Source: A.H. ter Weele, "A Comparison of Education Financing in Ethiopia, Kenya and Tanzania," Planning and Programming Office, Ministry of Education & Fine Arts, Addis Ababa, October 20, 1973, Table 1, p. 6.

present, or during a time horizon in the future within a reasonable degree of control, during which actual performance can be gauged and used as a basis for further development.

Long-term educational planning can set out national objectives based on estimated "economic" and "social" demand, and define overall policies and strategies for the attainment of these objectives, including estimates of resources that can be made available for education. The period covered by such an exercise may be 20 or 30 years. The Education Sector Review Commission recommendations for Ethiopia, for instance, have covered the period 1970-2000.

It is understood, of course, that almost everything is subject to change during such a length of time and that planners do not possess the foresight and capability to predict accurately all the changes that are likely to come about as a result of the cumulative and dynamic process of development. This is why it becomes necessary to define medium-term plan periods during which more accurate targets, resources and means can be specified.

The period of five years has by now become a conventional medium-term planning period. The development of the education sector of Ethiopia within the five-year period of national planning (1974-1979) is in the main expected to be based on the long-term projections and strategies recommended by the Sector Review Commission. The targets adopted and policies pursued during this plan period will, therefore, constitute one phase of planning towards the attainment of the long-term aims.

During this time period, the educational plan may need revision or overhauling. An assessment of Ethiopia's Third Five-Year Plan, for example, revealed that the picture that developed from a review of performance in the education sector during that period was one of complexity and rapid change. Goals set at the outset of the plan, as in adult literacy and vocational-technical education, needed to be reassessed. Understanding of the motivations and aspirations of the people, market forces, the economic and social climate, and other factors that affect objectives and their achievement had changed over time.^{12/} Hence, the need to modify and redefine the original objectives in light of new information.

Haile Sellassie I University in Ethiopia also faced the necessity to redefine objectives. For example, it was reported that La Follette's plan called for the University to expand rapidly from its enrollment of 1,626 in 1963-64. He expected an enrollment of regular full-time students of 5,500 by the year 1980. In fact, full-time enrollment reached 6,474 in 1973, that is ten years after the La Follette report, rather than in the expected 17 years. "With respect to staffing, in 1963-64, the University had a total of 232 instructors, a ratio of one instructor for every six students. La Follette planned a reduction in this ratio to 1:15, he envisioned an instructional staff of approximately 335 for an enrollment of 5,500. In fact, the University has doubled the staff since 1963, and the ratio now stands at 1:9."^{13/}

^{12/} Planning Commission, "Assessment of the Third Five-Year Plan," Addis Ababa, 1973 (Mimeographed).

^{13/} Summer-skill, J. HSIU: A Blueprint for Development, Addis Ababa: HSIU, 1970.

Similarly, in a 10-year plan for the controlled expansion of Ethiopian education in 1955, it was proposed that by 1964, annual output of teacher education in Ethiopia would be 232 teachers. In actual fact, Ethiopia was producing somewhere in the region of 2,000 teachers annually by 1964. There is certainly a big difference between 232 and 2,000.

It is obvious, as indicated above, the implementation of educational aims depends on what action can be taken in the present and the period of time during which maximum control over resources and means is attainable. This is the period which may be characterized as the short-term period, a period often tied with the annual national budgeting cycle.

The short-term period is critical, for it is during this period that planners are often compelled to adjust objectives and means in the light of successes or failures in the recent past and the resources that are actually available. Failure to attain educational objectives within the time specified, which by no means is a rare occurrence, can result in a confusion of priorities unless planners and administrators are alive to such eventualities and are able to respond with alternative strategies consistent with the medium-term and long-term objectives.

The description of planning in terms of the long-term, medium-term and short-term should not obscure the fact that development is a continuous process. As pointed out above, it is to be able to deal effectively with the cumulative and dynamic nature of development that phasing is required. The degree to which intertemporal coordination is achieved in practice in educational planning leaves much to be

desired, however. This is partly due to the complexity of the undertaking and the limitations of the planning machinery.

Spatial Considerations in Educational Planning

Spatial or geographic considerations are an important aspect of planning, fundamentally because implementation of plans takes place in relation to given locations as within given periods of time. A few of the general considerations pertaining to this dimension will be mentioned here.

First, the distribution and character of the population and the resources of a country are almost always varied and uneven. This calls for not only the exploration of the possible lines of development in specific territories, but also for a distribution of investment depending on the needs and possibilities of these territories.

Secondly, existing political and administrative divisions of a country will often set the pattern of distribution or devolution of power as well as of planning responsibility. This is in general desirable from the development viewpoint, as the planning effort can be made more fruitful by permitting the design of development strategies geared to meeting the specific needs of particular areas.

Thirdly, it is found that within a developing country, the rural and urban sectors show clearly disproportionate development. In Ethiopia, for instance, one estimate puts GDP per capita at Eth. \$109 in the rural sector as contrasted with E\$680 in the urban sector.^{14/}

^{14/} Fassil, G. Kiros, et al., "Financing of Education," ESRC/5, Education Sector Review, Addis Ababa, p. 65.

Distribution of education between the rural and urban sectors is also highly uneven. Different educational policies are, therefore, indicated under such circumstances.

Finally, the problem of location of schools within a given territory often presents itself as a relatively difficult one as this would have to be determined on the basis of multiple criteria which may include population distribution, availability of land, accessibility, availability of construction material, etc.

The foregoing general description of the scope and requirements of educational planning may seem to some to be exceeding the limits of planning in practice. Planning, however, is still in the experimental stage and in developing countries generally has not received sufficient commitment and the actual organizational, financial, and technical support required. Nevertheless, educational decisions of any consequence explicitly or implicitly are always based on assessments and calculations along the lines described.

CHAPTER III

EDUCATIONAL NEEDS FOR DEVELOPMENT

Most social scientists in the developing world agree that education plays an important role in the development process. Disagreement begins over the definition of the term "development" and the precise relationships between development and the education sector. In this chapter, we explore the variety of connotations of "development" measures and indicators of its progress over time, and the connections between development and the education sector. We shall develop the view of education in the developing world which will dictate how we will proceed, in later chapters, in classifying and measuring educational outcomes.

To anticipate somewhat later sections, we shall analyze the education sector, and hence its outcomes, according to outcomes which contribute to national goals or objectives. We endorse the view stated in the Educational Sector Review for Ethiopia:

The role of education should be determined within the context of national goals and overall aspirations of a people. Educational objectives as well as all the activities that take place within the educational environment must be shaped within such a context (1972:III-1).

National goals are multifaceted--encompassing political, social and cultural aspirations as well as economic. The education sector includes not only the formal educational system but the non-formal and informal

as well. The nonformal system is the structure of vocational, extension, and cooperative institutions teaching specific skills or arts and generally organized in complete units with no hierarchy of levels. The informal educational system is the nonstructural system of learning embedded in family and community practices.

One way of viewing the role for education is outlined in Diagram 1. As that diagram shows, the education sector is one of several complete units contained in the development process; it is composed of input, process, and output variables. [We shall focus on outputs most relevant to the education sector's role as part of the development process.] The development process is the behavioral and structural molding of the components of a developing society. Theoretical models, planning systems, and systems analysis provide some insight into this process. Well defined quantitative and qualitative variables are used as development indicators to check the progress of many different socioeconomic variables.

The entire development planning process is based on development objectives or goals. Multidimensional development goals dictate the role of education and other elements of the development process, and determine which educational outcomes are most relevant. Although the sequence tends to be viewed as unilinear proceeding from left to right, in actuality the process is circular--all elements interact upon one another.

In what follows we discuss definitions of development and the multidimensional approach to development as embodied in development models; we describe development indicators, giving examples of their construction and use; and finally we examine the possible linkages between the

education sector and development, providing specific examples of education programs which contribute concretely to development.

THE MULTIDIMENSIONAL APPROACH TO DEVELOPMENT

Education's outputs are multidimensional in a multidimensional development context. By conceptualizing the development process, we can gain some insight into the interaction between development goals and the education sector's outputs. An understanding of the development process also allows us to develop indicators by which we can gauge the progress of development, and most particularly, education's contribution.

The term development has generally been considered synonymous with economic development because, first, it is obviously important, second, because it is more clearly delineated than other facets of development, and, third, it conforms readily to the standard unilinear conceptualization of the development process. Most planners, however, now recognize that development has many dimensions--social and political as well as economic. As Edgar O. Edwards and Michael P. Todaro remarked at the Bellagio, Italy Conference on Education and Development:

Traditionally, "development" has been associated with high rates of growth in aggregate and per capita incomes. Recently this narrow definition of development has been challenged and increasing emphasis given to other dimensions such as employment opportunities, income distribution, the provision of social services, and the alleviation of poverty. Similarly, this wider view of the meaning of development has led policy makers to evaluate education not only by its contribution to growth but also by its effects on poverty, employment, and income distribution (p. 8).

Theories of development are usually expressed as development models, the form of which may range from a very loose verbal statement of the

key points to a highly structured, formal mathematical model with clearly defined components and relations. A development model is a means of summarizing the relations among the principal components of the development process. The policy objectives for a society provide guides that help steer the theoretical construct in the proper direction. The components of a development model may include the individuals or relevant groups interacting in society, behavioral relations among them, structural parameters, identities, and feedback loops. The behavioral relations express reactions to economic or social stimuli; an example is the economic consumption function expressing the changes in individual consumption levels which result from changes in income. Structural parameters define the institutional milieu of the development process. Depending upon the scope of the model, these could include the legal system, financial institutions and their operating procedures, and social working customs. If the development process is conceived of as an interactive system, feedback loops between different sectors are important and must be specified.

There are many models of development extant; most are models of economic development. There will be no attempt here to survey the different development models, but it may be useful to indicate some of the differences in the models to illustrate the diversity and to indicate different conceptual roles for education.

There is a broad class of theoretical models of economic development featuring a variety of conceptions of the growth process. There are highly structured models, such as that of Chenery and Strout which feature concentration on somewhat mechanical key functional relationships between savings, capital accumulation, import requirements, etc. The

policy implications of such a model are generally straightforward. The role of education is not really considered, but is taken as a structural constant. On the other hand, there are equally highly developed planning models of economic development in which the education sector is assigned a key role; the role played by education is usually a very simple one of providing skilled manpower as characterized by formal educational attainment. Tinbergen and Bowles have each contributed to this type of approach.

There are also models of economic development which have been classified as "organic" or involving stages through which developing economies pass. This type of explanation of the development process involves describing the stages of development and fashion by which nations move from one stage to another. [The most famous example of this unilinear development process is Rostow's Stages of Economic Growth. Education's contribution is usually vague and merely contributes to the process of moving from stage to stage. Such approaches do involve structural change and give rise to indicator's of development which vary from stage to stage. For example, the unemployment index may be important for the highly developed, mass-consumption economy but inappropriate for an agrarian economy.]

An entirely different developmental approach is the class of models characterized as psychological. In these models the behavioral components are explicitly spelled out and receive the major share of attention. Generally some key factor in economic growth is isolated and its psychological-behavioral component is scrutinized. A key example is McClelland's theory of development which fastens on the personality of a society as an indicator of the pre-condition for economic growth. N-Ach is the characterization he uses for a collection of personality

traits conducive to a "mystique of achievement"--the collective desire by a society to excel. The presence of such a mystique signals a climate conducive to innovation and the rapid acquisition of skills vital for economic growth. Formal education's role is again vague. McClelland and his associates did undertake to try and inculcate N-Ach in short trial courses in India with, they claim, considerable success.

In an approach adopted by some of the more innovative theorists, development is defined as the enhancement of the capacity of a society to provide for the well-being of its members over time. The problem is defining capacity enlarging policies. Seers defines the key factors as poverty, unemployment, and income inequality--he focuses on the human dimension rather than the rigid economic criteria such as GNP per capita. Development is shown by improvement in these three factors. Culbertson's ecological approach to development also focuses on living standards as the key facet of development. Education aids development as it enlarges capacity; for example, education may decrease income inequality.

As can be seen by the few models types surveyed, different approaches to development lead to the emphasis of different facets of the development process. The key point is that education may fill different, important roles depending upon the development objectives and the development process. Education will serve a different function depending upon whether the development process is conceived of in mechanistic, economic terms or in light of behavioral theories of development; education's role also depends upon whether the objectives of development are economic, social, political, or a combination of the three. Finally, education's role will depend upon whether the development process is unilinear or whether significant feedbacks occur throughout the sectors.

We will conceive of the education sector as one sector in a systems approach to development. Such an approach allows accommodation of a variety of structures and behavior. A systems model is a collection of structural parts of a society linked by well defined interrelationships. The behavioral relations can be of many different types. Structural changes can be incorporated, both one time changes such as land reform and continuous changes such as the movement out of agriculture.

The difficulty with such a comprehensive approach is in formulating the precise relationships between sectors of society. However, the generality of the approach allows the incorporation of several key features: (a) two-way causation, i.e., education causes growth and growth leads to further education, (b) recognition of qualitative as well as quantitative dimensions of development, (c) incorporation of structural change, (d) identification of key relationships between sectors, and (e) incorporation of a variety of development objectives or goals.

Statements of national goals are often contained in planning or assessment documents. They may be phrased in very broad terms or may be specific and narrow in scope. An example of the former is the description of national goals contained in the Education Sector Review for Ethiopia:

- (1) to strengthen national unity by promoting the integration of people and culture;
- (2) to accelerate fast economic growth and development and thereby insure adequate living conditions for all citizens;

- (3) to develop a democratic society founded in freedom, equality and justice
- (4) to foster in all citizens a firm sense of right and responsibility;
- (5) to shape the society appreciative of its heritage but imbued with a spirit of dynamism and innovation; and
- (6) to build a self-reliant nation that constructively participates as a member of the African community of nations, and of the world community.

The document also stresses that educational objectives must reflect these broad goals (III-1). We take a similar approach as we look specifically at education's potential contribution to development as a whole.

In Ethiopia, for example, education in the form of the teaching of Amharic in schools could promote cultural integration. Both formal and non-formal education contribute to productivity and hence economic growth; the latter more obviously than the former. General education, as it becomes more universal, provides the tools for an informed and democratic citizenship.

Often the goals for the education sector are cited specifically and, therefore, provide an even better idea of how education may contribute to development. The Education Sector Review for Ethiopia lists the objectives in the following manner:

- (1) to foster a rational and scientific outlook on life; to cultivate objectivity, intellectual curiosity, tolerance, and broadmindedness;

- (2) to replace the traditional negative attitude towards manual labor by a positive one;
- (3) to increase the earnings capacity of individuals by providing relevant skills and knowledge; to make people economically self-reliant;
- (4) to cultivate the desire for lifelong education when formal schooling has been completed;
- (5) to provide scientific, technical, and vocational education particularly at the secondary level in keeping with the needs of Ethiopian society and economy;
- (6) to Ethiopianize the content of education; to Amharicize the medium of instruction at the higher levels and give practical orientation instruction at all levels;
- (7) to create an integrated society by drawing upon the diverse cultural and linguistic elements and creating conditions for the formation of a truly national culture;
- (8) to create national consciousness among all the people of the Empire;
- (9) to foster full participation of all people of Ethiopia in the life of the nation;
- (10) to reduce the generation gap between the educated young and the traditionally oriented old; to bridge the gap between school and society;
- (11) to prepare the nation's youth to live in a world community;
- (12) to equalize access to education among all parts of the Empire; and

(13) to provide universal access to education as rapidly as possible (III-445).

Development Indicators

Development indicators are designed to capture some facet--economic, social, or political--of the development process. They may be direct measures such as GNP, used to measure the output of goods and services; or they may be indirect measures such as infant mortality, used to measure health. Indicators may be restricted to the narrow class of observable phenomena which can be objectively measured, such as the percent of persons who are literate (although the criteria for literacy may be subjective). Or indicators may include phenomena measured by subjective instruments or opinion. An example is an index of political awareness, based on expert evaluation of the political process over time. Since development tends to be an interdependent process, a good indicator reflects many more things than it directly measures.

Indicators may be aggregative or disaggregative. A composite indicator may be formed to represent a varied phenomena; for example, GNP is used to represent overall economic well-being. A more

disaggregated approach might feature a spectrum of indicators such as an index of industrial production, unemployment rates among classes, and the inflation rate.

Indicators also may be used for a variety of purposes or aims. One development indicator may serve diverse policy planning purposes. For example, the index of literacy may indicate the result of educational expenditures (or lack of it) to the economist. However, to the political scientist it may be an indirect measure of political awareness--such awareness depends on communication, which in turn depends on literacy. Or the sociologist may consider literacy to be an indirect indicator of social mobilization.

Finally, the question arises how indicators are validated. There are two methods widely used. The first is the use of expert consensus; this method is commonly employed to form and validate qualitative indices of development. The second is the use of correlational analysis, or other multivariate techniques, to select among indicators on the basis of close association with leading indicators. This method is of value when there are several possible indicators of a given dimension of development and there is no theoretical reason for choosing among them. An example of this approach is provided by the UNRISD study of socioeconomic development. There were several possible indicators to capture the dimension of health--among the possibilities were expectation of life at birth, infant mortality rate, crude death

rate, and inhabitants per hospital bed. It was found that expectation of life at birth correlated most closely with other indicators and hence was used.

In the past very simple indicators were used. Since most development analysis was economic, per capita GNP was the most popular. However, even while GNP was being used, there was growing awareness that development included dimensions beyond the economic and that per capita GNP was not a good indicator of economic progress. Planners recognized that per capita GNP does not include economic activities of non-monetized sectors, which are of considerable importance in many less developed countries. Also, this measure is subject to distortions due to exchange rates and variations among countries in relative prices. And, finally, per capita GNP does not take into account intercountry differences in the distribution of national income and the composition of output.

The need to correct these inaccuracies has led to reform measures. For example, upward adjustments for improvements in the quality of products, introduction of new products, and increased leisure have been attempted. Similarly, there have been downward adjustments for decreases in nonmarket production and for costs of increasing urbanization. But the point remains that one composite indicator, such as per capita GNP, does not represent the many parts of the development process.

The dissatisfaction with traditional measures of development has led to broad attempts to capture the multidimensionality of development. One well known example is the study done by the United Nations Research Institute for Social Development (UNRISD), Contents and Measurement of Socio-Economic Development. The goal of this study was to produce

an overall index of development which would capture its multidimensionality. UNRISD started with 73 social and economic variables, and then began a process of elimination. That process eventually produced a list of 18 variables of which nine were economic and nine were social. The list included both process variables denoting changing levels and structural variables showing change in economic and social structure.

The ordinary least squares technique was used to produce a group of core variables which would correlate together most closely with measures of individual and social welfare. A system of weights was determined which was used to combine all of the indicators into an overall index of development.

Although the UNRISD selection of indices of development is open to criticism, it does have one very definite advantage--all of its variables are objectively measurable. In addition, it does capture some of the diverse aspects of development, including:

- (a) expectation of life at birth;
- (b) consumption of animal protein per capita per day;
- (c) vocational enrollment ratio;
- (d) newspaper circulation per 1,000 population;
- (e) steel consumption, Kg. per capita; and
- (f) percent salaried and wage earners to total economically active population.

One approach to the same problem was used by Adelman and Morris (1967). They attempted to assess the interactions among 41 variables representing economic, political, social, and health processes as well as structural change. Their list of variables is

reproduced as Table 1.

This list includes measurable variables, qualitative variables, and a mixture of the two. For example, the gross investment rate is an objective, quantifiable measure of an economic index of development. However, the degree of social tension, though it be based on quantitative data, relies on subjective evaluation. To provide an example of how development indicators are constructed, we shall examine the variable "Degree of Cultural and Ethnic Homogeneity." Adelman and Morris note that in the early stages of development social attachments of kinship, race, language, and religion tend to be strong. When these ties are strong, social and economic integration is retarded which makes initiating a process of economic growth difficult (1967, p. 41). Hence, an indicator which captures this heterogeneity, or lack of it, may capture an important facet of development.

The cultural homogeneity indicators should capture the extent of linguistic, religious, and social homogeneity. The linguistic dimension receives the greatest weight. This is a qualitative indicator and hence requires well defined classes, and a numerical ranking of 1 to 100. The source of information is expert opinion. The classes are as follows:

A: Over 85 percent of the population speak the dominant language, over 70 percent are of the same race. Within this class there are two subgroupings: homogenous religion and heterogeneous. Examples: Argentina, Somali Republic, Thailand.

B: Over 70 percent speak the dominant language, less than 71 percent population are of same race, religions categories are as above. Examples: Colombia, Gabon, Indonesia.

Table 1. Social, Political and Economic Variables: Adelman and Morris.

Size of the traditional agricultural sector
Extent of dualism
Extent of urbanization
Character of basic social organization
Importance of the indigenous middle class
Extent of social mobility
Extent of literacy
Extent of mass communication
Degree of cultural and ethnic homogeneity
Degree of social tension
Crude fertility rate
Degree of modernization of outlook
Degree of national integration and sense of national unity
Extent of centralization of political power
Strength of democratic institutions
Degree of freedom of political opposition and press
Degree of competitiveness of political parties
Predominant basis of the political party system
Strength of the labor movement
Political strength of the traditional elite
Political strength of the military
Degree of administrative efficiency
Extent of leadership commitment to economic development
Extent of political stability
Per capita GNP in 1961
Rate of growth of real per capita GNO: 1950/51-1963/64
Abundance of natural resources
Gross investment rate
Level of modernization of industry
Change in degree of industrialization since 1950
Character of agriculture organization
Level of modernization of techniques in agriculture
Degree of improvement in agricultural productivity since 1950
Level of adequacy of physical overhead capital
Degree of improvement in physical overhead capital since 1950
Level of effectiveness of the tax system
Degree of improvement in the tax system since 1950
Level of effectiveness of financial institutions
Degree of improvement in human resources
Structure of foreign trade

Source: Adelman and Morris (1967, pp. 16, 17).

C: 51-70 percent speak dominant language; less than 71 percent are of same race. Example: Ethiopia.

D: Less than 51 percent speak dominant language. Example: Kenya, India.

Obviously, education can contribute to the language factor and hence contribute to the development process.

Indicators of a detailed nature are not generally available. Yet social and economic indicators are being collected by international organizations on a small scale in a variety of countries. An example is the data collected for Ethiopia summarized in Table 2. This sample gives an accurate notion of the current breakdown between economic and social indicators. The emphasis is still heavy on economic indicators, but social indicators are growing in importance.

The uses of development indicators are varied. One obvious use is to describe quantitative and qualitative development over time. Another is to test empirically specific theoretical development models. A final use is for policy planning. This is an amalgam of the previous two, as policy planning is based on theory and description. We are most interested in the policy planning approach and thus shall examine the link between education and development from a policy perspective.

EDUCATION AND DEVELOPMENT

We have discussed the multidimensional approach to development, the means available to measure it (development indicators). Finally, we shall briefly discuss the evidence bearing on education and development.

Table 2. Ethiopia Indicators of Development.

<u>Economic and Social Indicators</u>	<u>Unit</u>	<u>1961-65</u>	<u>1966-70</u>	
GDP (61 prices)	% Δ	4.4	4.5	
Manufacturing output		16.4	16.5	
Agricultural output		2.0	2.2	
M=goods and services and net for foreign sector		15.0	1.0	
X=goods and services and net for foreign sector		12.6	3.2	
Price level		3.7	2.8	
Domestic		<u>1961</u>	<u>1966</u>	<u>1970</u>
Gross national savings	% GDP	10.9	9.7	16.6
Resources gap		.6	2.0	.7
Net factor payments		.2	.1	.7
Gross domestic investment		11.7	11.8	18.0
Debt service	% X	3.0	6.1	11.4
Central government deficit	% GDP	8.0	9.6	11.5
Central government surplus		.8	1.3	.6
Public expenditure on social services		1.5	2.1	2.9
Military expenditures		4.0	4.0	
Manufacturing output		3.2	4.4	
Energy consumption	Mill, KWH			305
Fertilizer consumption	Thou, tons			
<u>Social Indicators</u>				
Pop growth rate	% Δ	1.8	2.5	
Urban pop growth rate	% Δ		6.5	
School enrollment primary and secondary	% school age population			15.0
Population per hospital bed/number				3,400

Source: IBRD, Eastern Africa Department.

Evidence Concerning The Relationship Between Education and Development

There have been many studies done on the relation between education and economic growth, most of which have two definite limitations. One is that development has been narrowly defined as economic development. The second is that education is usually narrowly defined as formal education. Both limitations are the result of data problems as well as narrowness of conception.

The evidence for the developing countries rests primarily on cross country studies for the correlation between education at different levels and GNP per capita. One difficulty encountered in these studies is how to measure education. Literacy, expenditures on education or enrollment ratios are possible proxies. In many of the studies, enrollment rates are used since they are more easily available and are broken down by school level.

A study by Harbison and Myers (1964) examined the relation between economic growth and an index of human resources development. The index was the weighted sum of enrollment at the second level of education as a percentage of the age group 15-19, and the enrollment at the third level of education as a percentage of the relevant age group. The second group was given a greater weight. Using this index, Harbison and Myers divided 75 countries into four levels and correlated this index and 11 other indices with two indices of economic development, GNP per capita and the percentage of the active population

in the agricultural sector. The results indicated that educational development was highly correlated with economic development.

Bowman and Anderson (1963) performed a multiple factor analysis of 32 countries and found positive correlation between primary enrollment and the level of literacy and per capita GNP. But the correlations were low, and other factors proved to be far more influential. Thus, they concluded that there is no convincing evidence that education is a necessary condition for economic development (1963, p. 45).

Objections to this type of preliminary evidence center on the use of a unidimensional measure of development with the premise that development is a dynamic process--cross-sectional studies give little evidence on processes over time. A further objection is that the measure of education, enrollment rates, may not capture education's developmental influence as it focuses just on the formal education system.

Curle has overcome the time objection somewhat by correlating past primary school enrollment and present per capita GNP levels. He found a positive relationship with a correlation coefficient of 61.

McClelland (1960) tried a different measure of development--kilowatt hours per capita consumed. He claimed this measure is superior because it is an unambiguous measure of industrialization, and a standardized statistic which is widely available. His results showed that better educated countries tended to develop at an above average rate. His evidence is comparable and consistent with previous studies; however, he was still using a unidimensional measure of development.

So far we have discussed evidence on the relationship between education and development implicitly assuming that education leads to development. However, some development analysts believe there is significant reverse causation. Higher levels of per capita GNP lead to higher levels of investment in educational structure, more leisure time, and hence higher enrollment rates. Statistically the use of correlation analysis does not permit the investigator to disentangle causation. A specific study of causality has been undertaken to disentangle the joint correlations between GNP per capita and enrollment ratios. The relation of these variables over time was examined for 67 nations. The results showed that for the poorest nations (per capita incomes below \$150), national development affected educational development more strongly than the reverse ordering. For the richer nations, the usual linkage seemed to be correct in its specification. These results were also broken down by levels of formal schooling without any appreciable differences.

The aggregate studies are fairly dated and inconclusive. It would seem that to capture the role of education in development we need more detailed information, or we must restrict our study to specific components. One way to do this in a policy planning framework is to measure the productivity component of specific issues.

The rate of return analysis is discussed in detail in a later chapter.

The approach has many critics. One of the most outspoken is Gunnar Myrdal, who feels that this "investment in man" approach misses the key effects of education-attitude and institution changing effects. The rate of return analysis takes as given motivational factors, attitudes, economic structures and tradition and calculates the investment component of education within this static framework.

An attempt to introduce attitudinal factors as an educational outcome bearing on productivity and growth was made by David McClelland in his measuring of what he calls n-Ach. As discussed previously, this term refers to the need for achievement, the outward response by

individuals to the desire to innovate, build, and develop. Individuals with high levels of n-Ach, as measured by tests and behavior, tend to set moderately difficult goals for themselves, seek feedback as to their progress, assume personal responsibility, and show more initiative and exploratory behavior. In short, they are successful entrepreneurs-- a class economists have long recognized to be particularly conducive to economic growth.

McClelland found, in work done in the late 1950's, that the n-Ach content of a society tended to increase prior to rapid economic growth and decline prior to a slackening of growth. Since attitudes are seemingly a slowly inculcated facet of personality, these results did not seem to have much significance for policy. However, in the 1960's McClelland and associates tried to see if they could inculcate some form of n-Ach by a course administered in India. The results were measured by increases in business activity (increase in hours worked, number of new firms established, capital invested, increase in employment) and increases in economic performance (increase in gross income, increases in profits) for the group who underwent training versus a control group who did not. The results suggested that n-Ach can in fact be taught.

A novel view of the relation between development and education which suggests that there is a different type of development--information processing capacity (IPC)--and a different dimension of education --Educational Structural Differentiation (ESD) from those normally discussed. The IPC of a society is a measure of its capacity to produce and promulgate information. Similarly, the ESD is a facet of the

education sector which is measured by the variety of different education outlets and modes. The greater the structural differentiation, the greater the IPC of the society.

Investigators in this area have shown that ESD is a key factor in IPC and in the usual development indicators, and that the relationship between ESD and the two development measures is stronger than the parallel relationship between typical measures of the strength of the education sectors, e.g., enrollment ratio, and IPC and the usual development indicators. This is an interesting, highly speculative, approach and indicates a different role for education, different educational outcome measures, and different educational policy.

There are negative outcomes of the educational process which, since education absorbs a large part of national expenditures, can result in a lessening of development effort. Specifically these refer to two well documented phenomena--educational wastage and unemployment among highly educated groups. Both of these outcomes can hamper the development effort and hence are negative links between education and development.

Educational wastage results from high rates of dropping out of school and repetition, of course. Both of these symptoms are present in any school system and may be an indication of high standards. Yet if they occur for motivational reasons, or at a high level, they should be regarded as an indication that the educational system may be a liability to development.

There are a variety of factors which can lead to wastage. They may include a sense of hopelessness inspired by the culture or cultural

problem which hampers learning. For example, in Senegal many refuse to learn the language of the former colonizers--French--which is also the language in the schools. Ninety percent of the population speaks Arabic, and thus the language becomes a barrier to school participation. Other causes include poverty, parental attitudes, lack of achievement motivation, and religious conservatism--an example of the latter is found in Nigeria where some religious groups are apathetic to western style education and hence enrollments tend to be low and dropouts high.

Another symptom of wastage, or perhaps of negative investment outcome, is high unemployment among school leavers, particularly among university graduates. This is a serious problem in developing countries because it signals a tremendous waste of scarce educational resources. The causes include the lack of relevance of the school curriculum, low capacity of the economy to absorb the graduates, and improper functioning of the labor market (lack of information, performance of placement offices, or social barriers). Another possibility is that secondary school leavers develop an attitude that certain (blue collar) jobs are beneath their dignity, or that the admission to the university is the only road to success. If the school system fosters such attitudes, then the unemployed school leavers can be considered a negative outcome of the education sector.

Problems such as these have led to a restructuring of curriculum in many less-developed countries. In Ethiopia, 20 percent of the primary and secondary school curriculum is devoted to practical skills. In Kenya, additions to the educational system such as village polytechnics teach skills like beekeeping, tanning hides, carpentry, as an adjunct to the academic sequence. In Ceylon, in the Junior

Secondary level, up to 20 percent of the curriculum is devoted to preoccupational studies and, as in Ethiopia, they bring in "teachers" with practical experience.

CHAPTER IV

PLANNING FOR NONFORMAL EDUCATION AND OUTPUTS*

Nonformal education programs, if administered correctly, may well contribute in a significant fashion to development, though there is no solid evidence as to their efficacy. Some examples follow:

--Programs designed to provide farm families with ancillary skills for home improvement, better farming methods, skills for earning additional income through sideline activities. These are rural extension programs. To the extent they are successful they will increase productivity and the standard of living--both of which are development objectives. An example is the Office of Rural Development (ORD) in the Republic of Korea.

--Programs to provide rural young people with employable skills for off-farm use. This type of program is productivity increasing and contributes to relieving population pressures on the farm. Hence, it may well contribute to the productivity and well-being of those left behind. Examples include Kenya's Village Polytechnics, already mentioned, and Thailand's Mobile Trade Training Schools.

--Programs designed to upgrade and broaden skills of practicing artisans, craftsmen, and small entrepreneurs. These are rural pro-

* Material on non-formal education programs adapted from International Council on Educational Development, Attacking Rural Poverty, 1973.

grams aimed at improving the skills of incipient craftsmen and merchant classes. Examples are the Rural Artisan Training Centres in Senegal and Vocational Improvement Centres in Nigeria.

--Nonformal indigenous training systems or apprenticeship programs aimed at developing self-help skills or new trades. Examples include Accion Cultural Popular (ACPO) in Colombia featuring self-help projects for home improvement, ORD (Korea) for home and community improvement centers, and the previously mentioned Village Polytechnica (Kenya) and Vocational Improvement Centres (Nigeria). These programs can contribute to many dimensions of education and help to reach that large segment of the population which is most neglected in education.

An example of a project designed primarily for agriculture, but with a strong education component, is the CADU (Chilalo Agricultural Development Unit) in Ethiopia. Its goals are (a) to bring about economic and social development in the project area, (b) to give the local population a sense of responsibility for development work, (c) to verify methods of agricultural development, and (d) to train native staff to carry on the work. In the course of accomplishing these goals, the project produced changes in attitude such as would be captured in the Adelman and Morris indicators. The project developed a sense of cooperative effort which contributes to a transformation of the traditional agricultural sector. The training and attitude changing effects of this project are educational outcomes subject to measurement which contribute to development objectives for Ethiopia.

Most developing countries have extensive health training facilities

in recognition of the fact that improvement of health skills and services is an important, if often implicitly stated, goal of development. Health education contributes to an:

- (1) increase in life expectancy;
- (2) increase in the quality of life;
- (3) increase in job productivity;
- (4) decrease in absenteeism;
- (5) decrease in accidents;
- (6) increase in family planning; and
- (7) change in income distribution.

In Ethiopia, there is a wide variety of education programs subject to outcome measurement which are geared to health needs. The Public Health College and Training Center at Gondar is oriented toward rural needs, training health officers and community nurses. The Ethiopian Nutrition Institute conducts nutrition surveys periodically. Private organizations which conduct education courses in family planning include the Family Guidance Association, Population Council, International Planned Parenthood Federation, USAID, and the Swedish International Development Authority (SIDA). There are also the Midwife Training Center and the Medical Services Division of the Ministry of Public Health. The variety of programs attests both to the importance of health education and the many dimensions of development that it affects.

An example of an educational project contributing directly to development on a micro scale level in several underdeveloped countries, but in Ethiopia in particular, is the Work Oriented Adult Literacy

Project (WOALP). This program, under the aegis of UNESCO, is a total development education program incorporating the acquisition of reading, writing, and arithmetic skills, occupational/technical knowledge (productivity increasing courses for agriculture or industry), socioeconomic knowledge, health, hygiene, and nutrition instruction, and changes in attitudes. The basic idea is to teach a gamut of skills in the context of the individual's work and life style.

Outputs in Nonformal Education*

The process of planning for nonformal education differs little from the processes of analysis of more formal structures. Are output measures required for nonformal education?

In view of current interest in nonformal education we separately consider this question, with the answer: "Yes." Output measurement is perhaps even more important to nonformal education than to the formal educational system. In the formal educational system there is minimally the yardstick of "years of attendance" and also school leaving examination grades. For the secondary and tertiary levels there is frequently the homogeneous student characteristic that guides evaluation. These are lacking in nonformal education.

Nonformal education has been advanced with these purposes:

(1) the programs tend to be inexpensive; (2) low capital and manpower investments involved in nonformal schemes allow them to be altered with a minimum of cost; (3) many new approaches can be developed by educators without the barriers imposed by tradition-bound formal

* This material is based in part on an essay on Nonformal Education and Development Objective by Idrian N. Resnick.

structures; (4) the programs can reach into remote areas and further rural development; and (5) the functional learning methods to which nonformal programs lend themselves produce skills that directly meet the needs of productive activities. Thus, low cost, flexibility, and ease of adaptation for building specific knowledge and skills in a population group argue for nonformal programs to accomplish objectives like increasing health, knowledge, food production, or productivity in a rope factory. Nearly all nonformal programs are component parts of other development projects, whether sanitation, crop expansion, generation of electricity, in-factory production, or even reinforcing a body politic.

Nonformal education essentially has two aspects. One aspect can only be assessed in terms of final product or more specifically, the saving in inputs into a given output, i.e., farm crop yield, or in terms of a higher output such as higher rice or fish product per given inputs. The other is the development of the persons whose knowledge, skill and attitudes are being advanced to effect the cost saving or output gain. To analyze the effectiveness of a nonformal program, it may be necessary to move back from the ultimate purposes such as more crop production, or reduced debility, disability, and lower death rates to criteria such as measure of specific knowledge about fertilizer, seed, planting, harvesting, or skill in use of farm tools, and so forth. At the same time, the need for human development suggests that not only should immediate knowledge and skills be imparted in nonformal programs but that access be kept open

to encourage further personal advancement. The midwife who learns about the relationship between hygiene and maternal or infant deaths may prove so competent that acquiring additional health knowledge and skills would be desirable, both in the national interest and in the interest of achieving the initial project purposes, i.e., reduced maternal and infant deaths. Assessment of her competence and of experience may provide an avenue to more formal education and further personal development.

The purposes of nonformal education have two general aspects, namely, (1) project development and (2) personal development.

Evaluation of nonformal education thus, in part, turns on evaluation of the final project objectives and design of criteria of assessment that can capture and assess those project objectives as quantitatively, objectively, and completely as possible. If the project has rural development as its goal, rural development will have to be defined operationally in such terms as a rise in crop yields by some percentage, more food supplies, better nutrition for the population of the nation in terms of daily nutritional requirements, less migration into urban areas, and so forth. These items would require further specification. They are not intended to be more than suggestive of the kind of final project outcome to which nonformal education contributes as a component. Or it may be desirable to move back to a lower level than final project purposes in assessing nonformal education and to specify the skills and knowledge that are judged to be important to the achievement of the final project purposes. What must be known, by how many, in what setting, in order to carry

out the project purposes? And do the required numbers of persons know what they must know? These lower order criteria become the measuring rods. In a subsequent chapter, the question of work skill measurement is discussed. The skill measurement problem is no different in the context of nonformal education than it is in a more formal structure. In both cases, it is necessary to know whether the behavior of the individuals who have participated in a learning exercise gives evidence of the learning.

The need to be assured of skills acquired are not the same for all tasks. The worker who works with complex machinery--for example, in a electrical energy generation installation--perhaps must be evaluated more carefully than a peasant who works his own land with a hoe.

The project may be of a different kind, in which changes in consumer behavior are the desired outcomes. Or, in connection with national population policies, broadened choice about child bearing may be an important objective. The measurements for judging the impact of the project and the learning acquired are of various kinds. The change in birth rates in the nation is one possible criteria. Another is the knowledge that the population has about methods of controlling births. Still another are attitudes about choices regarding child bearing.

Personal development objectives are additional to the more narrow project purposes. These objectives may be little different than those of the formal educational system. Of direct project

concern is personal betterment through learning, for example, about crop yields, energy generation, family planning, or nutrition. Further progress of the individual marks the follow-on steps. It is a follow-on of knowledge and skill acquisition that points to a more open system that permits cross movement between the nonformal learning and the more formal methods. Potential advance is in part necessary to motivate performance in the first instance but it also is a way to assure that the necessary skills are developed in the appropriate numbers throughout the hierarchy of skills.

To permit such flexibility, it is essential that measurement criteria be adopted that permit evaluation by the more formal education system of knowledge and skills acquired nonformally. The conversion of experience into tested competence will allow cross-overs from one system to another.

When nonformal education aims at transmitting specific useable skills, such as skill at farming a crop or automotive repair, a method for measuring the program's success is to use observation tests during and at completion of courses and follow-up with surveys on the job or in the village where the skills are applied. This nonformal education evaluation certainly has much in common with more formal structures. In common, too, is the process of formulation of objectives and design of criteria of measurement. Measurement is a process from conception to result and subsequent modification. Decision-makers need to increasingly improve their ability to specify output-oriented objectives and find alternative ways of achieving them. This is true

with respect to the broad aims of educational policy and planning and the specifics of programs and projects. Courses of action must allow for evaluation while in process and not simply after completion. This is not only necessary to improve projects but so as to integrate new techniques and information that continually become available. And critical evaluation of strategies, programs and projects is required in order to determine whether objectives have been achieved or whether those purposes have to be redefined. Information, careful planning, the ability to consider the long as well as short view, and more relevant ways of assessing efforts are all required. They are necessary and perhaps even more attainable in nonformal processes than formal ones because aims are more specific and structural change more important to success.

Costs of providing learning often link outcomes of nonformal and formal methods of education. There are many respects in which costs of the two methods may be considered as "joint costs" or resources for one type of educational program may be made available without significant marginal cost for use by the other. Among the resources that may be shared or made available through one method for use by another method are these:

- school plant;
- school equipment, especially TV;
- agricultural agents as instructors;
- health workers as instructors;
- school teachers as instructors;
- factory foremen as instructors; and
- factory equipment as teaching resources.

Thus separation of nonformal programs from more formal systems may prove costly.

Measurement efforts in nonformal education should avoid the pitfalls of inadequate or inaccurate evaluation in which the wrong questions are raised about outputs and relation of inputs to outcome. In a case not too atypical--a farmers' training center was analyzed in detail after a reasonable period of time had elapsed to determine whether the courses offered were having the desired impact upon the production behaviour of the participants. Due caution was taken to insure that results were measured against a randomly selected control group. It was found that the impact of the courses was low and that the student farmers were not literate enough to effectively absorb the material. It was recommended that future classes select farmers with a higher degree of literacy, where possible, and that literacy courses be provided before the students begin work at the centers. The point is that, because of pre-conceived notions about the farmers and the training course, the analysis did not seriously consider the possibility that the materials used by the center, or even its entire approach to learning, was unsuitable for producing the desired results in farming.

Planning processes determine the application of outcome measurements. It is necessary for planning purposes to assess projects at a meaningful and manageable level. When project output is not specific, as it may not be in the case of a nutrition project or child care, analysis has essentially to start with identification of specific measurable goals of the political-economic decision that made the project "worthwhile." For example, literacy programs either make

people "literate" or they do not; they remain "literate" or pass back into "illiteracy." Both literacy and illiteracy need specific definition before analysis can take place.

Caution in comparison is important because often programs may seem to have the same goals, but in fact differ because they serve a different clientele or have been adapted to some peculiar local conditions; assuming that they are transferable without loss of efficiency may be a mistake. When decision on whether or not to implement a particular nonformal project is of concern, several factors are worth keeping in mind: (1) a simple supply and demand analysis, confined to the relevant market, is suitable for projects producing specific marketable skills; (2) the number of people served directly (students) and indirectly (those who receive the direct impact of what the students learn) can be estimated; and (3) the availability of manpower to conduct the programs.

To facilitate criteria generation and measurement, the objectives of each program should be clearly spelled out in advance so that, subsequently, evaluations can be made in relation to those objectives, and programs may be assessed for the realism of their objectives. As noted before, shortcomings should always be analyzed in terms of the programs themselves, as well as the students, and the wider context in which the skills are expected to be applied. Flexibility and imagination in the design, application and assessment of outcome measures is essential. Impacts should be measured on students, teachers, outside observers, and the establishments-villages-groups-

institutions in which the "graduates" apply the knowledge and skills they are expected to have acquired.

Some of the outcome measures familiar to formal schooling may be useful for particular nonformal programs. These include: pass rates, enrollment retention, placement of "graduates" in jobs related to training received, ability of courses to attract good students, the extent to which courses equip students to work with local materials, at scales relevant to their environment, literacy rate changes, vertical mobility changes within establishments (promotion rates), replacement of foreigners, improvement in various health conditions, agricultural improvements--more extensive use of "modern" inputs, and production increases, higher group and/or individual incomes, changes in participation rates (e.g., cooperative membership gains), alterations in work roles--more responsibility for women, and improvements in the ability to qualify for credit. These data obviously suggest a wide variety of developmental variables.

Some Illustrative Further Measures Assessing Educational Outcomes of Non-Formal Education

Enrollment in civil service training courses.

Unemployment by educational levels compared to unemployment by those who have attended non-formal schools or had non-formal training. This could be done by regions in each country.

Attrition rate of primary and secondary schools compared to attrition rate of non-formal schools.

Percent of persons between the ages of 14-50 enrolled in non-formal education programs.

Illiteracy reported by persons 14 and older.

Annual value of agricultural products marketed in rural sector.

Enrollment in womens' organizations according to following categories providing education for:

Basic health and hygiene
Dietary and household organization
Domestic farming.

Morbidity rates.

Skills, knowledge, and attitudes toward health by "testing" according to age categories. Included may be such items as:

houseflies can spread serious diseases
vaccination is the reason so few people get smallpox
pasteurization of milk kills bacterial harmful to man
urinating in drinking water may be harmful
urinating in the moonlight does not cause syphilis

attempts at choosing a well-balanced meal.

Malnutrition figures over a five year period.

Crop yields and types of crops.

Infantile death rate.

CHAPTER V

INVESTMENT OUTCOMES OF EDUCATION

INTRODUCTION

Investment outcomes of education are well defined educational outcome measures and economists have done extensive work defining and measuring the investment component of education. General use has been made of the concept of human capital formation and the decision rules concerning yield of education. In what follows, measures of the investment outcomes of education will be explored, examples of their use will be given, and problems with their formation and policy usefulness will be discussed.

Measures of the investment outcomes of education are of both a macro and micro variety. On the aggregative side, the past emphasis has been on the measurement of education's contribution to the total growth of an economy. Foremost among these contributions has been the work of Denison and Schultz in the United States. Schultz estimated capital formation through education. Denison essentially disentangled the overall growth rate into the portions attributable to physical capital formation, growth in the labor supply, technological improvement, and the improvement in the productivity of labor due

to education. This type of work measures the total educational outcome from society's investment in education, i.e., the capital formation due to such an investment; it does not measure the educational investment outcome of a particular type of non-formal schooling. In this aggregative approach, investment is equated with capital formation, and the link between this type of capital formation and economic growth is explored.

The micro approach to educational investment features the calculation of the marginal or average productivity component of specific forms of education--such as formal education or various types of non-formal education. The productivity component or measure is the contribution to economic output of an educated person due solely to the individual's training. The measurement of educational productivity may be direct--the actual change in output due just to education--or indirect--that is, through the use of an intermediate measure of productivity such as income changes due to education. The indirect measures are the most common; many studies for a variety of countries feature the calculation of the rate of return or the net present discounted value of education --the two most widely used indirect measures of the investment outcomes of education.

Finally, education can produce changes in productivity, or increases in economic growth, in the future by changing technology through the fostering of invention and innovation. This dynamic effect of education can be measured indirectly, though imperfectly. We discuss this under the caption of Motivation to Change.

In this section, a brief description of Denison's approach will be given and his basic results examined.

Denison's analysis uses the concept of an aggregate production function to separate the relative contributions of labor, land and capital to GNP. The particular form used in these studies is the Cobb-Douglas production function which can be specified:

$$(1) Q_t = e^{\phi t} A_t^\alpha L_t^\beta K_t^\gamma, \quad \alpha + \beta + \gamma = 1$$

where Q_t is output in period t , A_t^α , L_t^β , K_t^γ are land, labor, and capital inputs in period t , e is the natural constant, and $\phi, \alpha, \beta, \gamma$ are constants.

Denison assumes that education affects aggregate growth through its effects on labor quality. In his framework, education can increase labor productivity because (1) an educated person is likely to perform better than an uneducated person, (2) education leads to greater individual flexibility and initiative, (3) education implies a better labor market information system and thus more efficient labor allocation, and (4) growth increases need for technologically trained individuals familiar with basic techniques and amenable to modern working conditions.

The process Denison used to arrive at a measure of labor's contribution includes these stages.

(1) Measure the productivity of a given increase in education. This is done by relating increases in education (years of schooling) and increases in income. This implies, as will be explained in a later section, equating income changes with productivity changes. It also implies correcting for extraneous factors which may lead to increases in income but which are not a result of education (e.g., ability and family background). This is done by, arbitrarily, assuming 60 percent of income difference correlated with education are a result of productivity increases.

(2) Adjust results to allow for the effects of longer school years over time, since this has been the trend in both developed and less-developed countries.

(3) Finally, use information on the change in the educational attainment of the labor force and the effect such changes produce in productivity to compute the increase in labor productivity over time. An increase in labor productivity is equivalent to an increase in the labor force itself in this method and can, therefore, be used to calculate education's aggregate contribution to increases in GNP.

Summary results of Denison's study are presented in table 1.

Table 1. Estimates of the Contribution of Education to Past and Future Growth of Real National Income, U.S.A.

	<u>1909-29</u>	<u>1929-56</u>	<u>1960-80</u>
Growth of total real national income	2.82%	2.93%	3.33%
Amount of growth rate ascribed to education	0.35	0.67	0.64
Percent of growth rate ascribed to education	12	23	19
Growth rate of real national income per person employed	1.22	1.60	1.62
Amount of growth rate ascribed to education	0.35	0.67	0.64
Percent of growth rate ascribed to education	29	42	40

Source: Denison (1964:35).

They show the effects of education on two measures of aggregate U.S. economic performance over time: the growth in total real national income and the growth in real national income per person employed. The results demonstrate the importance of education's contribution within the context of the limited model employed by Denison. Education's contribution to the total growth in real national income ranges from 12 to 23 percent and to the total growth in real national income from 29 to 42 percent depending upon the period chosen.

There are three major criticisms of these summary measures of educational outcomes. First, the use of income differences to reflect productivity differences is inaccurate due to the inapplicability of the marginal productivity theory of income distribution and the effect of

other factors besides education on income. Second, many economists believe that the aggregate production function does not accurately reflect the production process of an economy with so many heterogeneous inputs, or that the Cobb-Douglas form is not the correct specification of an aggregate production function. Finally, there is much debate as to whether the "residual" approach can explain aggregate growth, or whether there is any reason to favor the educational "explanation" of the residual over another.

MICRO INVESTMENT MEASURES

Cost Benefit Analysis

One of the best known methods for analyzing investment decisions is cost-benefit analysis. In this method, the stream of costs is compared with the stream of benefits resulting from investment in any form--whether it be investment in plant, equipment, inventories, or education. On the basis of comparing cost and benefit, a variety of measurements of the value of an investment can be formed and decisions concerning whether the investment should be undertaken, can be made. In this section those measures, as applied to human capital formation, and examples of their use will be explained.

Economic markets typically perform functions similar to those of benefit-cost type analyses--they direct the allocation of funds into purchases of goods and services. The type of decisions that benefit--cost analysis may help make, however, are not generally amenable to market solutions. Benefit-cost analysis tries to do explicitly what the price system does implicitly in those cases where the market fails due to internal economies of scale, external effects in production or

consumption, or the presence of collective goods. Education is one area where the market system does not perform its allocation function efficiently.

The human capital approach to education is very similar to the well developed theory of physical capital formation. Investment in education and training is, like investment in physical capital, a process which yields benefits over time into the future and which may also produce costs into the future. It is a different process than the buying and selling of goods in the present time period which are consumed in the present. We shall consider the decision to pursue further education in the same framework as the decision to invest in further capital formation. The measure of the profitability of the educational investment process is the measure of the investment outcome of education.

The heart of benefit-cost analysis lies in a clear and accurate description and measurement of the benefits and costs associated with education. The costs of education are somewhat easier to conceptualize. The direct costs of education are those costs incurred in the provision of education, including:

- (1) salaries of teachers and auxiliary staff;
- (2) supplies provided by and for the school;
- (3) rent for land usage;
- (4) interest (debt service);

The indirect costs are those incurred by students (or the school system if the student is subsidized) in pursuing his education. These include:

- (5) room and board if the student has to live away from home;

- (6) additional clothing required for school;
- (7) transportation to and from school;
- (8) cost of personal supplies;

Finally, there are costs which are measured by the foregone opportunities of pursuing education instead of its alternatives. Examples of opportunity cost include:

- (9) the value of the tax exemption enjoyed by non-profit educational institutions; and
- (10) the opportunity cost of the student's time (he could be employed) while he is going to school.

These categories include the most commonly mentioned cost items, however, in actual measures of costs many items will be excluded or only roughly approximated for lack of data. Also, some costs will not appear directly --tuition and fees, for example, are already covered by the uses to which they are put--teacher's salaries, equipment, etc.

A distinction is often made between social and private costs of education. Social costs are those borne by society in providing educational facilities; they are covered by all of the categories listed thus far. Private costs are those items that the individual personally pays. These will include many of the items listed, such as transportation or personal supplies, as well as that portion of the other costs he may have to pay under the heading of tuition and fees. Since the social cost category is more extensive, social costs are equal or greater than private costs. This distinction becomes important later in analyzing the private versus social investment component of education.

In many studies of the costs of education, the largest category is the opportunity cost of the student's time. This can vary widely from

one educational level to another; it is lowest in the primary levels and highest at the university level. At least one study has found that opportunity costs represent 50 percent of total resource cost for four years of university education.

In practice, usually only the direct costs and opportunity costs are captured. The former is sometimes easily available in the form of total educational expenditures by a ministry of education. Opportunity costs are approximated by the salaries earned by persons with a lower educational background. For example, the opportunity cost for a high school student is the average wage earned by an individual with a primary school education. In some cases other costs may be imputed--for example, personal supplies may be imputed as 10 percent of individual costs.

One example of cost data is provided by the study of Kenyan education by Hans Thias and Martin Carnoy (1972). They used widely scattered figures to calculate direct costs. For total teacher's salaries, they used the average salary for each category (primary school teacher with two years post primary school training, for example) and multiplied by the total number of teachers in that category. To estimate expenditure on equipment, the capitation grant was multiplied by the total number of students. Other expenses were approximated by a lump sum expenditure by the Ministry of Education. Capital costs were estimated by a set sum per pupil based upon a certain number of places provided by a school building of a specified type. For example, the capital costs for a primary school with a permanent structure was estimated at K £ 12-20 per pupil, while the capital costs of a traditional "mud-and-wattle" type structure were only K £ 1 per pupil. Because school buildings have different lifespans, the costs were amortized over 40

years for the permanent structure and 10 years for the traditional structure.

For purposes of illustration, it might be useful to take a concrete example. The example, drawn from a benefit-cost analysis of the Ethiopian educational system, illustrates the problems that occur and means of overcoming them. Table 2 summarizes total costs per student by Education Level. Direct costs include recurrent costs (teacher's salaries, maintenance, student out-of-pocket costs, etc.) as well as capital costs. Wastage captures the repetition and failure costs inherent in the educational process. Income foregone is the opportunity cost of the students' time and is approximated by the average wages earned at the previous educational level.

Table 2. Total Costs Per Student by Educational Level, in Ethiopia.

	Direct Costs	Wastage	Income Foregone	Total Cost Social	Private
Primary (6 yrs.)	468	\$ 132	\$ 309	\$ 909	\$ 417
Junior secondary (2 yrs.)	288	-	675	963	693
Senior secondary (4 yrs.)	1,060	324	2,677	4,061	2,787
Tertiary non-degree (2 yrs.)	5,400	810	3,181	9,391	3,075
University (4 yrs.)	17,408	6,093	6,826	30,327	6,641

Source: Planning Commission Office of Ethiopia (1973:8).

The direct costs are gleaned from three sources. The first is national educational expenditures by the state at that level divided by the number of students at the level. The Ministry of Education and Fine Arts

has been the main source for this type of data. Capital costs are estimated at 8 percent of total costs at the primary level, 18 percent at the junior secondary level, 21 percent at the senior secondary level, 20 percent at the tertiary non-degree degree level, and 20 percent at the university level. Finally, out-of-pocket costs for students are also estimated at 10 percent of total costs at the primary level and \$50 annually for university students.

One problem with this study was that a large proportion of students attend non-government schools which have much lower costs per pupil. Yet the cost per student figures were taken from government sources. The solution was to estimate national costs per pupil as a weighted average by enrollments in the different types of schools, using available data for the level of cost discrepancy in the various types of schools.

Table 2 shows there is considerable discrepancy between Social and Private costs, particularly at the higher levels of education. Social costs are higher because of government subsidization of direct costs and the inclusion of wastage in social costs. Private costs are simply direct costs borne by the student (very small at all levels) and income foregone minus any subsistence allowance.

Educational benefits are of many kinds but only a few are quantified for inclusion in analysis of this type. A partial listing of benefits as usually enumerated for this purpose are:

- (1) increased earnings for the individual;
- (2) increased productivity for society;
- (3) increased capacity of individuals to adjust to new circumstances, jobs, job opportunities;

- (4) consumption benefits for the individual;
- (5) benefits to society of invention and innovation that are generated by increased levels of education;
- (6) discovery and cultivation of talent by the educational system;
- (7) provision of manpower for economic growth;
- (8) better citizens (and hence lower crime costs);
- (9) Intergenerational effect; and
- (10) external effects on other individuals, family, employees, and employer.

The focus is on the increased productivity of the individual and perhaps others due to the education of an individual. This last effect is an externality, but bears on the investment consequences of education.

In a more dynamic context, the invention and innovation aspects of the educational system are also investment and play a major role in economic growth. These outcomes, as well as the cultivation and discovery of talent, will be covered later. The present question is how the productivity effect of education can be measured.

The standard procedure for estimating the productivity consequences of education is to assume that the marginal productivity theory of income distribution holds, and then use the direct link it provides between income and productivity. That theory states that under conditions of perfect competition an individual is paid the value of his marginal product or marginal contribution to output. Hence, in measuring the productivity of education, we use the change in income level an individual receives as a result of the change in his educational status

as a proxy for the increase in productivity the change in education may occasion.

In practice, the procedure is to use income levels across educational classes as a measure of the investment benefits of education. This requires detailed census or questionnaire data which is usually difficult to obtain for developing countries. The problem is compounded by the need for information on more than just education and income data. Many other factors affect income levels besides education--a person's ability, his family connections, his age or years of experience, his occupation or for whom he works. Hence, data must be collected for all of these variables in order to isolate education's contribution.

Nevertheless, such specialized data is collected and has been used in a number of developing countries. The Kenyan study made use of the results of cross-section urban earnings data collected in the Labor Force Survey made in January-February 1968 and a rural cross-section survey of households in the Central Province in 1963-64. The Labor Force Survey consisted of 4,742 interviews collected in Nairobi, Mombasa, and Nakuru. Questions were asked about wages or salaries, sex, years of schooling completed, type of school, age, father's occupation, parent's literacy, ethnic origin, number of years spent in the city where interviewed, age of finishing school and beginning work, number of years with present employer, whether or not currently receiving formal education, whether or not the individual received on-the-job training, if African, his or her tribe, whether or not the individual belongs to a union. The less extensive rural survey generated a sample of 800.

The next step is to generate age-income profiles by means of regression analysis, i.e., estimating an equation of the following form:

$$(2) Y = B_0 + B_1 X + \sum B_{zi} Z_i + U$$

Where Y is the income variable, X is the age variable, and the Z's are socioeconomic and occupational variables. This type of equation is specified for each educational class. The results capture the effect of education without the influence of the other factors affecting some income classes. Table 3 shows the results of regression analysis used to construct Age-Earnings profiles.

Turning to the Ethiopian example, a similar procedure was used with an equation of the form:

$$(3) \log Y = a + B_1 X + B_2 X^2 + B_3 D_1 + U$$

Y is the annual cash income in Ethiopia; X is age, X^2 is years of

Table 3. Age - Earnings Profiles for Kenyan Males, by Years of Schooling, 1968, Adjusted for all Variables*

Age	YEARS OF SCHOOLING				K sh PER MONTH		
	0 - 2	3 - 5	7 ^A	7 ^B	7all	9	11all
2-14	-	-	289	-	287	-	-
15-16	-	-	183	-	266	-	-
17-19	261	264	267	320	243	310	125
20-24	332	275	276	322	266	185	385
25-29	339	328	339	410	345	315	484
30-34	385	353	388	558	497	384	791
35-44	387	387	399	596	466	685	898
45-54	380	383	505	907	633	539	405
55+	379	358	-	592	460	1981	-

Source: Thias and Carnoy (1972:43).

* These results are corrected for experience, ability, family background, ethnic background, economic status.

a. Failed Kenyan Primary Examination (KPE).

b. Passed KPE.

schooling, D_1 is the dummy variable used to distinguish the effects of public vs. private sector employment. The data was collected by the Ministry of National Community Development and Social Affairs in 1971-72 for a sample size of 476.

This equation is a different functional form from that used in the Kenyan study. Here educational attainment is captured by direct inclusion of the education variable; the numerous socioeconomic occupational variables of the Kenyan study are absent (except for public versus private sector employment) due to lack of data. Also, the semi-log form of equation (4) provided a better fit to the Ethiopian data.

The actual estimation, for the Ethiopian data, produced the following results:

$$(4) \log Y = 2.36039 + 0.01135X + 0.08025X \\ (0.01787) \quad (0.00052) \quad (0.00096) \\ - 0.13765 + e \\ (0.00997)$$

$$R^2 = .945$$

The numbers in parentheses are the standard errors of the regression coefficients. All are significant at the 1 percent level. This, in addition to the high R^2 , has been interpreted as giving great accuracy. The results can also be expressed in the equivalent form:

$$(5) Y = 229.30 \frac{(1.0265)^{X_1} (1.2029)^{X_2}}{(1.3729)^{D_1}} e$$

This provides the following information:

- (1) given the starting income of 229.30, each year of age (experience) increases income, on the average, by 2.65 percent;

- (2) each year of school raises income by 20.29 percent; and
- (3) employees in the private sector receive an average of 37.29 percent higher salaries than individuals in the public sector.

Equation (6) provides for the construction of age-income profiles for different educational classes. Yet there are several complicating factors. First, ability, family background, etc. are not represented, thus, part of the income differences shown between classes is due to these factors, not education. Economists in the past tried to compensate for this problem. Denison, for example, arbitrarily attributed 60 percent of the income difference to education and 40 percent to other factors. Recently effects of family and peers have been analyzed.

Becker used a sliding adjustment of 60 percent for primary and secondary levels and 66 percent for the tertiary level. In the Ethiopian study, the adjustment factors were .5 for primary, .6 for secondary, and .7 for tertiary. These were considered reasonable in light of the international evidence.

The second adjustment needed is for mortality. As individuals finish school, commence work, and progress towards a retirement age, mortality takes its toll. Future incomes should be adjusted for the possibility of mortality by use of life expectancy tables--now computed for many countries. In the Ethiopian study, this was not done, rather each individual was assumed to work to retirement at age 65. This omission, however, may not make much difference in quantitative terms since mortality is low when individuals are young and their earnings are discounted only slightly, and mortality is high only when individuals are

near the end of their working life, and their incomes are discounted heavily.

A third complication is that the investment consequences of education occur only if individuals enter the labor force. Therefore, income levels should be adjusted for labor force participation rates. In the Ethiopian study, a bias was introduced by the use of participation rates from the National Sample Survey of rural males with the income data for urban males. This is a typical example of problems resulting from lack of data in developing countries.

A fourth adjustment is required for unemployment within educational groups. Since survey data are gathered from those who are employed, it omits the reduced incomes due to unemployment which would further reduce income differentials. This correction was not incorporated into the Ethiopian study which again introduces a bias as unemployment among secondary school leavers appears to be growing into a problem of major proportions.

Finally, to distinguish between social and private benefits, private benefits are based on post-tax incomes while social benefits are based on pre-tax incomes. The idea is that tax revenues are used for government expenditures which are, presumably, for the benefit of society. If this is the only adjustment undertaken to distinguish private from public benefits, social returns will always be higher.

After taking account of all of these adjustments, the benefits of education can be constructed for any age level as table 4 demonstrates. There both income levels and income changes between educational classes are captured for age 38. The adjustment for taxes is introduced in later calculations.

Table 4. Median Income Estimates (Age 38), Ethiopia, 1971-72.

	Gross Income	Gross Increment	Net Income	Net Increment
Unschoolled	499		247	
Primary	1,510	1,011	746	499
Junior Secondary	2,185	675	1,295	549
Senior Secondary	4,575	2,390	2,712	1,417
Tertiary non-degree	6,620	2,045	4,577	1,865
University degree*	9,579	5,004	6,626	3,914

Source: Planning Commission Office (1973:6).

* Compared with senior secondary.

The Kenyan study includes attempts at correction of the benefit stream for mortality, experience, socioeconomic variables (previously mentioned), ability, the individual's occupation, unemployment probabilities, and the income effect of the results of the Kenyan Primary Examination--an important examination for further schooling and employment. The exact results will be considered later with the rate of return analysis, but it may be useful to look at the procedures used to adjust for several of these complications. Age-earnings profiles of Kenyan males corrected for socioeconomic, occupational, and ability variables were presented in table 3.

The effect of ability, mentioned previously with respect to the Ethiopian results, can be approximated by comparing the returns of those who pass the KPE (Kenyan Primary Examination) with those who fail. The results of these examinations are not the best measure of ability but some aspects of ability are captured.

Outcome Measures Based on Benefit-Cost Analysis

Benefit-cost analysis is used in a variety of ways to aid the economic decision-making process. It can also be used to measure the investment outcomes of education. (In this section, the net present discounted value (NPDV) and the internal rate of return (IROR), their uses, and their problems will be described.) These are both indirect measures of the productivity consequences of education; they represent the indirect relationship, under the marginal productivity theory of income distribution, between education and real output.

Both measures employ the benefits and costs as described in the last section in their calculation. Those benefits and costs cannot be compared directly, for there is a fundamental problem of timing. The costs will be incurred over a short span of time, while benefits from training will extend well into the future of the individual's working life. Thus, the problem is one of comparing costs and benefits over different time periods. This problem is solved in the economic context by discounting a stream of benefits or costs in present value terms.

Economists recognize that a dollar received in a year is somehow different from a dollar held today. The most obvious difference is that a dollar today can be invested to yield a dollar plus interest in a year. So the problem really is one of comparing money from two different time periods. The solution is to convert future receipts or payments into their present dollar equivalents through discounting. Once the dollar receipts are both expressed in present day value, they may be readily compared. Suppose an individual wished to convert \$100 received in a year to present value form. If the interest rate is six percent, then discounting the \$100 yields $\$100/(1 + .06) = \94.34 .

\$94.34 is the Net Present Discounted Value (NPDV) of \$100 received in a year. An individual would prefer to have \$100 today rather than \$100 in a year, but he would prefer \$100 in a year to \$90 today if he were influenced by strictly economic motives.

Using the NPDV, benefits and costs are discounted over their life at an appropriate rate of interest (how this interest rate is chosen will be discussed later) and are then used to calculate the NPDV of an education investment project according to the formula:

$$(6) \text{ NPDV} = \sum_{t=1}^n \frac{B_t}{(1+i)^t} - \sum_{t=1}^n \frac{C_t}{(1+i)^t}$$

where B_t is money benefits in time t , C_t is money costs in time t , and i is the interest rate. The time span is n years--perhaps 45 years for most human capital investments. This formula gives the entire value of the investment in human capital in present dollar terms. Due to the restricted way benefits are incorporated as discussed in the last section, the money benefits are equivalent to excess earnings due to additional education or training. Also, costs will generally be discounted over a shorter period of time than benefits, as costs are generally incurred in four to eight year intervals while benefits may last many years into the future.

As an example of the calculation of NPDV, assume training costs are \$1,000 in the initial period, but there are no costs after that. Assume further that the investment will yield \$100 a year in higher earnings over 20 years ($n=20$). Finally, let the prevailing rate of interest be five percent. The resulting NPDV is:

$$\text{NPDV} = \sum_{t=1}^{20} \frac{\$100}{(1.05)^t} - 1,000 = \$1,246.20 - \$1,000 = \$246.20$$

This final figure is one measure of the annual investment outcome of education.

The second major investment outcome measure is the internal rate of return (IROR). The formula for the calculation of the IROR is similar to that for the NPV, but in this case the interest rate is a variable. That rate is determined on the assumption that the benefit stream is equal to value of the cost stream.

$$(7) \quad \sum_{t=1}^n \frac{B_t}{(1+r)^t} - \sum_{t=1}^n \frac{C_t}{(1+r)^t}$$

To find the IROR, we solve (7) for r , the only unknown in the equation. Referring back to the initial example, we have:

$$\sum_{t=1}^{20} \$100/(1+r)^t = \$1,000$$

The solution is $r=7.75$ percent. This means that over the entire 20-year period of the educational investment, the compound rate of return on the initial investment of \$1,000 is 7.75 percent.

The NPV and the IROR are the main indirect measures of the investment outcomes of education. The question is which should be used. The measures are similar and usually will produce the same hierarchy of results, i.e., investment outcomes in one country will generally, under both measures, be either inferior or superior to those of another country. Yet there are situations in which the projected investment outcomes will differ according to the measure used. The decision on which to use in such cases involves a slight digression on the policy uses of these measures.

Policy makers have used both measures in their attempts to decide whether to invest more funds in education. Some calculate the NPV of all investment projects and use the results to rank the projects and allocate money accordingly--the higher the NPV, the better the investment opportunity. The calculation of the NPV, of course, requires a

specified interest rate. Alternatively, policy makers may calculate the IROR for all projects and reject those whose IROR is below the going interest rate.

The key issue is to determine what interest rate should be used for discounting in the NPDV for comparing with the IROR. The solution is to use the interest rate that represents the opportunity cost of the investment funds. For the individual decision-maker, that rate might be the yield on long-term government bonds since if he did not invest his money in his own education, he might choose this alternative use. For society, the rate should reflect the opportunity cost of funds drawn from the private sector, and society's rate of time preference between present and future social consumption.

Under either method, an interest rate must be used either for purposes of discounting as in the NPDV, or to provide a point of comparison as with the IROR. Thus, we must look to other criteria to determine which measure to use. A cogent reason for preferring the NPDV is that it allows comparison between educational investment projects of different time spans whereas the IROR requires that the time spans of the two projects to be compared be the same. Further, the NPDV will reflect differences in the size of educational investments while the IROR will not. The conclusion seems to be that when the IROR and NPDV yield different rankings of investment measures, the NPDV is to be preferred.

Conceptually, the NPV is a better measure of the investment outcomes of education, yet the IROR is most often used. The reasons are first, the two measures will generally yield similar rankings of projects and second, the IROR is unit free (the NPV is expressed in monetary units, the IROR is a percentage) and thus provides an easier frame of reference for comparisons. In the examples which follow, both measures will be provided where they are available. The first is provided by the Ethiopian study referred to extensively in the last section. Table 5 shows NPV's and IROR's for various types of returns to education.

Table 5. Returns on Educational Investment, Ethiopia.

Type of Return	Years of Schooling	6	8	12	14	16
Social IROR		20.3%	28.6%	18.7%	14.5%	9.4%
Private IROR		35.0	36.7	22.8	33.4	27.4
Gross private IROR		58.5	47.9	35.4	39.6	34.2
Social NPV* (mil.)		\$120.4	\$216.5	\$97.0	\$44.6	\$7.3

Source: Planning Commission Office (1973:10).

* The interest rate used is 10 percent.

The pattern of educational outcomes is fairly typical of many developing countries: high rates of return for the lower schooling levels (primary and junior secondary) and lower rates for the higher levels, the university in particular. The distinction between the social and private internal rates of return derives from the differences between social and private benefits and costs already discussed in the previous section. The category of Gross Private is based on the benefits which

are used privately but without the correction factors for ability, background, labor force participation, etc.

The NPDV's reflect the same pattern of outcomes as the various IROR's. This measure in Ethiopia was based on an interest rate of 10 percent, the relevant return for social investment projects in Ethiopia. The negative returns for university education are the result of a low IROR and the 10 percent interest rate used for the NPDV.

The overriding impression from these first results is that investment outcomes of education are extremely high. However, caution in accepting these results is suggested by the problems that will be discussed later.

The next example is from the Kenyan study of the previous section. This study is particularly interesting because it attempted to deal with many of the problems associated with benefit-cost analysis. The rates of return as reported in table 6 give a detailed breakdown of the private rates of return to all levels of formal education. The breakdowns include adjustments for age (experience), taxes, socioeconomic variables, and ability as approximated by exam scores. Furthermore, adjustments were made for employment probabilities for the combined urban-rural calculations.

As discussed above, the adjustments for age, socioeconomic variables, and ability are to separate out those factors which affect the benefit stream but are not a result of education. Taxes are adjusted

Table 6. Average Private Internal Rates of Return in Kenya to Schooling, All Adjustments, by Years of Schooling, 1968.

Urban Rates Corrected for:

	Age Only	Age and Taxes	Age, Taxes, Soc-econ, var, and Exam Score	corrected for: Employment probabilities only	Employment probabilities and soc-econ. variable
<u>Primary</u>					
2-4	26%	26%	31%	19%	23%
5-7	55	55	13	17	7
2-7	33	33	18		
<u>Secondary</u>					
8-9	24	24	9		
10-11	52	40	30		
8-11	36	32	19		
<u>Higher secondary</u>					
12-13	24	23	23		
<u>University</u>					
14-17	27	20	20		

Source: Thias and Carnoy (1972:91).

to allow for separation of the social and private rates of return. Employment probabilities adjust for the effect on earnings of unemployment in the various educational classes; obviously to consider all individuals as fully employed would bias upward the rates of return. Mortality is not included as an adjustment factor since the individual in assessing his investment return does not consider his lifespan; he can circumvent the quantitative consequences of an early death through insurance.

The pattern of results shows that the rates of return decrease as more and more extraneous factors are taken into account through adjustment factors. The most accurate assessment of the investment outcomes of education is shown under the last column for urban rates, where the rate for primary school is 18 percent, for secondary school 19 percent, and for the university 20 percent. There is a general equality of return across educational classes. The private rates are high, and demonstrate as they do for Ethiopia that education produces large investment returns for the individual.

The social IROR's to education in Kenya are shown in table 7. As explained above, the difference between social and private costs is the subsidy element reflected in social but not private costs. The difference between social and private benefits can be measured by the difference between pre and post tax income. The returns reported in table 7 incorporate the distinction between pre and post-tax incomes and also mortality and government employment effects. Mortality is included since the loss through death affects society's investment outcomes; government employment rates are included since differences between government and private wage rates which may reflect non-productivity differences should not be included in calculations of the rate of return.

Once again, rates of return decline as more and more of the extraneous factors are considered. The most accurate assessment of the social investment outcomes of education are under the last column of urban rates where the social return to primary education is 14 percent, to secondary 15 percent, and to university nine percent.

The results reported for both Ethiopia and Kenya demonstrate comparative results between social and private investment outcomes of

Table 7. Average Social Internal Rates of Return to Schooling in Kenya, all Adjustments, by Years of Schooling, 1968.

Urban Rates Corrected for

Years of schooling	Age only	Age and mortality	Age, Mortality and soc-econ. var.	Age, Mortality soc-econ. var., ability Kpe Cert. and Govt. Empl. effects	Combined Urban - Rural corrected for: Employment probabilities	Employment probabilities and soc.econ.var.
Primary						
2-4	16%	15%	11%	15%	14%	14%
5-7	38	38	17	14	11	5
2-7	22	21	14	14		
Secondary						
8-9	16	15	19	6		
10-11	34	34	28	21		
8-11	24	24	23	15		
Higher Secondary						
12-13	15	15	15	15		
University						
14-17	9	9	9	9		

Source: Thias and Carnoy (1972:92).

education which are present in all studies of this type. In both cases, the private outcomes are greater than the social outcomes. This is because the social costs include subsidies by the state to education which the individual does not pay; subsidies raise social costs at the same time as they lower private costs. On the benefit side, the difference between social and private benefits is interpreted in the narrow sense of the difference between pre and post tax incomes. There is some dispute as to whether this difference should be recognized since individuals presumably receive benefits from their tax dollars.

The difference between social and private benefits does not reflect the external benefits of education as discussed in the last section. Thus, it is likely that social rates of return are seriously understated, and would give an inaccurate description of the social investment consequences of education. There has been one attempt to estimate the degree of bias inherent in the usual method of calculating the social return to education. If the social rate of return is interpreted in the narrow sense described, introducing approximations for some of the other social benefits of education, including the external productivity effects of supervisory individuals, can lead to a doubling of the social rate of return. This provides a wide range within which the actual social rate of return may be found.

There have been studies of the rate of return to education performed for many of the developing countries. A complete listing is contained in table 8. Only social rates of return are included in the table. In general, there is a decline in the rate of return as the level of education increases. Overall, the rates of return to education are high, indicating large investment outcomes of education. They compare

Table 8. Social Rates of Return to Schooling by Country for Various Years, Primary, Secondary, and University Levels of Schooling.

	<u>Year</u>	<u>Primary IROR</u>	<u>Secondary IROR</u>	<u>University IROR</u>
Puerto Rico	1960	21%	22%	16%
Mexico	1963	25	17	23
Venezuela	1957	82 ^a	17	23
Colombia	1965	40	24	8
Chile	1959	12	12	9
Brazil	1962	11	17	14
S. Korea	1967	12	9	5
Israel	1958	16	7	7
India	1960	20	13	13
Malaysia ^b	1967	9	12	11
Philippines	1966	8	21	11
Ethiopia	1971	20	19	9
Ghana	1967	18	11	16
Kenya	1968	22	20	9
Uganda ^c	1965	66	50	12
Zambia	1960	12	-	-

Sources: George Pascharopoulos and K. Hinchlitye, "Rates of Return to Investment in Education and the Impact on Growth and Development: An International Comparison," London School of Economics, Higher Education, Research Unit, 1970 (Mimeo).

- a. The 82 percent represents the rate of return between illiteracy and six years of schooling, a rather broad interval. Income foregone is assumed to be zero. These two facts imply that the IROR is seriously overestimated.
- b. Rates shown here are underestimates of the unadjusted rates, since they have been corrected for non-schooling factors.
- c. Rates for Uganda are seriously overestimated, since they are based on differences between average incomes of employees with different amounts of schooling. This assumes that income differences are constant over lifetime.

favorably with rates of return to physical capital formation. NPV and the IROR are subject to two criticisms in addition to those concerning the benefit and cost calculations. First, in analyzing education the choice of units, usually years of education, leads to measurement error due to its impreciseness and discrete jumps (especially at the end of schooling levels such as primary or secondary). The result of such an error is that the rate of return tends to be underestimated. The second problem is that rates of returns based on annual salaries ignore the question of hours worked per year. If education induces an individual to work longer, then the usual rate of return measures will overestimate his investment outcome. The size of these biases or the relation between them is not known with any degree of accuracy.

There is a final problem associated with using the IROR or NPV as measures of the investment component of education. Since education costs money now and yields benefits into the future, individuals often wish to borrow to pay their current costs when their incomes are low and pay off their borrowings when their incomes are high in later life. To the extent that they are unable to absorb as much education as they desire, the private rate of return to education will be underestimated. This is because an individual's ability and education interact in affecting income. If an individual undertakes less education than he desires or than is efficient, the increment to his income is less by a factor that accounts for the interaction between his education and ability. This shortfall of income represents a real loss in productivity, since the individual with additional education would be more productive because of his additional education, and the interaction factor.

This problem results from the imperfect capital markets which often exist in underdeveloped countries. Capital markets require information regarding the returns to educational investment that is notoriously imperfect. In addition, there is always the risk of default by individuals which introduces an element of uncertainty into the analysis. These factors combine to produce higher borrowing rates (if loans can be had at all), less investment in education, and an under-statement of the investment return to education.

The intergenerational investment impact of education provides another measure of educational outcome. The intergenerational investment impact is the increase in earnings over costs by an individual due to the educational level of his parents. Many studies have found that a child's degree of education is positively correlated with that of his parents. This may happen for several reasons. First, better educated parents tend to instill in their children an appreciation of learning; second, children of better educated parents have higher achievement motivation; third, children of better educated parents are more aware of the financial implications of education; and, finally, hereditary ability plays a role. Whatever the reason the result is the same-- more education and greater productivity.

Measurement of the intergenerational impact of education makes use of the methodology of internal rate of return analysis. The social benefits of intergeneration investment are the present value of the extra lifetime earnings for each educational level multiplied by the probability of attaining the educational level actually attained due to parental education and discounted back to the time of the parental education. Estimates have shown that the intergenerational investment outcome of education is large.

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CHAPTER VI

MEASURING WORK SKILLS

Testing for Job Readiness

The design of work skill programs necessitates specification of measurements that can determine the product of training by assessing the level of competence in required skills. Discussed below are some of the important concepts and considerations which go into the design, administration, scoring and use of written, oral, work sample and performance tests used to measure the outcome of training.

Test Administration Techniques

All good tests, no matter how they are administered, have one common characteristic--they aim at objective measurement. To help make them more objective certain precautions must be taken. For example, questions must be stated the same way to all examinees and testing conditions such as room lighting, noise level, writing facilities and available tools and equipment must be as uniform as possible. The need for objectivity underlies the importance given in testing to the concepts of sampling, reliability and validity.

Tests are given in three basic ways: orally, in writing, and through the preparation of work samples. Rating scales frequently

used to grade the performance of employees are a kind of test in that they are used to measure individual differences. They are most nearly comparable to work sample tests. Many of the principles fundamental to good testing apply also to rating scales.

Oral tests are commonly used for individual testing. They are used (a) when written tests would be too costly to prepare, (b) when the level of reading ability of the examiner is too low or questionable, or (c) when the manner of oral response by the examinee is important. Employee selection through interviews by one or more "examiners," if carried out objectively, is a type of oral testing.

The most widely used is the written examination because written tests may readily be prepared, administered and scored under standardized conditions. Large numbers of individuals can easily be tested at one time. The test administrator or proctor needs to know very little about testing and even less about the technical content of the test. Good written tests are available for a wide variety of purposes, including measuring general mental ability, specialized aptitudes, knowledge of academic subject matter and job related information, spatial relations ability, and art judgment.

Work-sample tests are used to assess the ability of a person to make, operate, maintain or repair certain objects or pieces of equipment. They are practical tests requiring "hands-on" activity rather than written or oral response. They are superior to oral or written tests for work skills in that they measure competence to do certain tasks rather than to exhibit knowledge considered related to the tasks. But work sample tests are more costly to prepare

and more difficult to administer particularly for large groups. They often require special shops, tools and equipment, and a large number of examiners.

Most large employers, including civilian government agencies and military services, have formal systems for rating the performance of employees. Frequently such evaluation of employees is made on a series of rating factors contained on a special performance evaluation form. Similar rating forms are often used in oral interviews of job applicants. Use of rating forms is, as has been noted, a kind of test procedure; objectivity in design and use of the forms is clearly required to insure fair evaluations.

Job Readiness Tests--Design and Utilization

Testing as a Sampling Concept

Ideally, a test should provide a complete picture of the particular aptitudes, knowledge or skills which are being measured, though often such a complete evaluation is not practicable. Tests, therefore, sample the aptitudes, knowledge and skills being measured on the assumption that this sampling is adequately representative. Certain principles in the selection of test content must be adhered to in order to achieve representativeness.

Most important among those principles is that the material selected be essential to the job, not merely desirable. An automobile mechanic could properly be tested on his ability to identify and repair a defective carburetor rather than on his knowledge of the relative advantages of 4 versus 2-barrel carburetors.

The material should also be representative of duties usually performed on the job. It would usually be more appropriate to test an automobile mechanic on his ability to tune an engine, align front wheels, or replace brake linings than on his ability to rebore engine cylinders.

A good test should involve more than one task, for example, tuning an engine. There is no specific rule for the number of tasks which should be measured to provide adequate representation. Expert judgment and, if practicable, experimental validation of the test can best provide such information.

Tasks chosen for a work-sample test should include at least a few that separate the competent workman from the man meeting minimum standards. A novice automobile mechanic would be expected to tune an engine in a routine "tune up." It requires more skill to tune an engine if its distributor has been improperly replaced.

It is important also to consider the practicability of including any particular task in the test. Among the pertinent considerations are the length of time necessary to complete the task, the requirement for specialized tools and equipment, the ease of objective scoring and the possibility of injury to an unskilled or nervous examinee. For example, overhaul of an automatic transmission in an automobile would not ordinarily be a practicable task because of the time and expense involved. Demonstration of the manner of checking transmission fluid pressure would be preferable.

Communication is a vital consideration in testing. No test can be expected to measure the competence of the individual being examined

unless the examinee clearly understands what is expected of him. Instructions to examinees must be clear, in a language the examinee understands, and should use the same technical terminology to describe the task required as used in the locality in which the examinee learned his job and the same language.

Job Analysis and Testing

Complete and accurate information about the duties and tasks of a job or occupation is necessary before a good test can be constructed. This information is usually obtained from consultation with experts or by job analysis. Of the two, job analysis usually provides more accurate information.

Obtaining job information from experts is less costly than through job analysis, but may be inadequate or inaccurate. These shortcomings may result from the peculiarities of job duties in a given location; recent changes in job tasks of which the expert may not be aware; and the tendency of human beings to emphasize those aspects of a job they consider most important or typical. Use of expert opinion alone is most useful when on-the-spot job analysis is not practicable because of job location, time limitations, or a lack of skilled analysts.

Job analysis, a systematic listing and examination of the duties and tasks involved in a job, is done through observing people at work and interviewing workers and their supervisors. Job analysis information is vital for many purposes, including testing and design of training programs. The nature of job information compiled should be related to the purpose for which it will be used. Job analysis for test

construction purposes should report the relative frequency and importance of a task, its difficulty, the tasks which require the greatest skill, criteria of proper performance, special tools and equipment needed.

Written Skill Tests

Written tests may be used in some instances as complete or partial substitutes for work-sample tests. They can be used as complete substitutes if the duties of the job concerned involve written output as they do for professional and semi-professional occupations. They may also properly be used to determine knowledge which is job related or can ordinarily be acquired only by on-the-job experience. For most skilled trades, however, written tests are ordinarily poor substitutes for actual performance tests.

Written tests can determine the extent to which an individual has been exposed to a job. A carpenter should know the normal height of stair risers or the vertical parts of a paneled door. However, such trade information might not separate a carpenter from a lumber yard salesman or knowledgeable home owner. Questions must involve knowledge of special tools and equipment, working procedures and technical terms to be useful for a particular skilled occupation.

Written tests can also be used to assess knowledge required for job performance. For example, a carpenter could be asked to calculate the amount of studding lumber required for a room. He could also be asked how he would bore a hole at a 45° angle through a 2 x 4. Likewise, an electronics technician could be asked to specify how he would determine the wave pattern at a certain point in a television circuit.

Written tests have the great advantages of ease and low cost of administration, particularly to large groups of examinees. They require no specialized equipment, and if "multiple-choice" tests are used, objective scoring is readily built in. Their major shortcoming is that they do not permit an assessment of on-the-job skills on a relative basis. A craftsman may know all about a job and still produce an inferior product or work at a slower than acceptable pace.

Oral Interview Techniques

Oral interview tests can be used if the examinees have difficulty in reading, when limited numbers of examinees make preparation of a written or work-sample test too costly, or when the ability of the examinee to respond orally is a factor to be rated.

Since oral tests are usually used for selection situations involving relatively few individuals, per capital cost considerations normally preclude the kind of statistical objectivity exercised in the preparation of written or work sample examination. Special care should, therefore, be taken in the selection of questions to see that the material covered is important and representative. Likewise, since the inherent rigidity of the written word is absent, examiners should be particularly careful to assure that the procedures followed and the language used are the same for all examinees. Use of a commonly understood language is particularly important if the examinees come from varied cultural and linguistic backgrounds.

To limit the inherent tendencies toward non-objectivity in oral examinations, procedures and questions should be used written out and a specific rating scale be designed to evaluate examinee responses.

Certain kinds of subject matter lend themselves readily to oral examination. These include questions about the use of tools and the meaning of technical terms used in an occupation. Such questions are easy to prepare and can be objective and valid.

Technical experts can give valuable assistance in the preparation of oral trade questions and can be used as examiners. If the time and facilities permit, it is highly desirable to try out oral interview questions on skilled personnel of known competence prior to their actual use on examinees.

Work Sample Tests

Work-sample tests are usually the preferred measuring tool for selecting skilled craftsmen. They inherently minimize the need for language facility and in this respect are particularly suitable for use in developing nations. In addition, they possess more "face-validity" than do written or oral tests. Face validity is a term used by testing experts to describe test questions which are obviously related to their purpose.

It must be emphasized that a work-sample test is only as good as the care exercised in its preparation to meet the criteria of validity and reliability. Such a test constructed without strict adherence to the principles of good test construction could well be less valid than a properly designed written or oral examination. A valid work-sample or performance test is one which accurately predicts on-the-job competence. A reliable work-sample test predicts such performance regardless of who rates the examinees. It must give consistent results if administered to the same examinees at different times.

Validity is achieved by selecting test content which is important in a job and which discriminates between the competent and incompetent worker. Reliability is usually achieved through readministration of a test to the same or similar groups of individuals. To ascertain whether a test meets these criteria, it is necessary not only to use the judgment of experts but also to administer the work samples experimentally under controlled conditions.

The procedures used in the experimental administration of a test must be as close as possible to those to be used in the actual routine use of the test. The kinds of examinees must be similar, the tools, equipment and shop facilities must be the same. The time allotted for each task and the method of scoring must also be the same. The differences between the experimental and in-use administration of the test should be only those required by the experiment. Valuable experimental techniques include follow-up on the examinees to see how well the test predicts on-the-job performance or in certain experimental designs, how well the highly skilled man on the job does on the test compared with the less skilled individual or the novice.

As an example of the manner in which a work sample test may be prepared, the procedures used in developing a test for Machinists' Mates (MM) in the U. S. Navy are summarized below.* Only one of the work samples in the test is used to illustrate the procedure.

* The material on the MM test is based on a report to the Office of Naval Research, dated June 1972, titled, Nonverbal and Culture Fair Performance Prediction Procedures, authors Arthur I. Siegel and Brian A. Bergman.

A Machinist's Mate in the U. S. Navy operates, maintains and repairs steam propulsion and auxiliary equipment. He is not a machinist.

After a review of job analysis material and consultation with senior Navy MMs, the test designers decided that the most frequently performed and critical tasks that a journeyman MM had to do involved the ability to:

- (1) identify and use hand tools common to the job;
- (2) perform maintenance and read meters and gauges accurately;
- (3) make simple repairs in pressure lines;
- (4) perform simple troubleshooting and systems analyses in pressure systems;
- (5) operate certain equipment; and
- (6) assemble and disassemble "high frequency" failure systems.

As a sample of duty No. 2 above, a test was designed to check the individual's ability to cut a gasket for use in piping systems and his knowledge of the proper procedures in gasket cutting.

The instructions given the examinees are to cut a gasket. The tools furnished are: a flange, a ball-peen hammer, asbestos gasket, material and some bolts. The time allotted for completion of the task is 10 minutes. The scoring checklist used by the examiner shown below is scored on all or none basis for each rated factor.

Table 1. Scoring Checklist for Making a Full-Face Gasket.

1. Uses round end	_____
2. of ball peen hammer	_____
3. and correct size gasket material	_____
4. and taps out one bold hole	_____
5. lightly	_____
6. Inserts bolt in hole	_____
7. Taps out diagonally opposite bolt hole and inserts bolt	_____
8. taps out remaining bolt holes in any order	_____
9. lightly	_____
10. Taps out inside circumference of flange	_____
11. using round end of ball-peen hammer	_____
12. lightly	_____
13. Taps at outside circumference of flange	_____
14. using flat end of ball-peen hammer	_____
15. lightly	_____
16. Remove tapped out pieces of gasket material from gasket and flange	_____
17. No frayed edges in final product	_____
18. No gouges or scratches in final product	_____
19. Does not ruin or throw away any pieces of gasket material.	_____

Other material included in the test measures the examinee's knowledge of the names of tools used making and breaking a flange, his ability to read certain meters and to diagnose the fault in a pumping system.

As has been noted previously, objective scoring of multiple-choice written tests is easily achieved. In some types of work-sample lists objective scoring is also simple to accomplish. In others subjective judgments must be made, but the human factor of examiner judgment should be limited as much as possible.

In the gasket cutting test, most of the items can be scored objectively. There is some room for difference in judgment as to when a hammer is used "lightly" or whether there are "scratches in the final product."

In work sample tests, tests involving construction of objects or repairing machinery, actual measurement of size, closeness to tolerances or precision of angles at joints, is practicable. Scores can be set at the various levels of precision in the final product. In tests involving location of defects or "trouble shooting" of systems, ratings can be given in terms of time required to identify the source of the difficulty. The nature of the work sample will test the ingenuity of the test designer to develop appropriate objective testing criteria.

Undoubtedly, the low profile of vocational education, and the cost of developing performance tests, have been principal factors in hindering the growth of vocational testing beyond the written exam stage. Unfortunately, in most cases, written tests do not make good substitutes for practical ones. A good craftsman is not necessarily competent with the written or even the spoken word. He is best measured by what he can do, not by what he can write or say.

SUMMARY OF THE STATUS OF WORK SKILL TESTING

Oral Trade Tests

Much can be learned about an individual's "exposure" to and understanding of a trade through the use of oral trade tests. Oral trade questions, as they have been developed, are not designed to grade the relative competence of knowledgeable craftsmen. They may, however, be properly used to separate the least knowledgeable and least qualified individuals from those who are better informed.

The U. S. Training and Employment Service of the Department of Labor has used tests to identify individuals in over 700 different occupations. These tests were discontinued after World War II. They could provide a solid basis for the development of modified versions in many of the less developed countries.

The Oral Trade Questions used by the Employment Service were designed to elicit short specific answers. To limit the possibility of guessing, any questions which might be answered by "yes" or "no" were omitted. Every effort was made to put the questions in simple language the worker would understand and to use only questions important in the trade. The questions were developed by studying job content, by questioning qualified workers, and by discussions with supervisory employers.

An initial group of questions for each trade was tried out on three different groups of workers: (a) experts, (b) apprentices and helpers, and (c) workers in related occupations. Those questions which differentiated individuals in group (a) from those in (b) and (c) were retained; the others were discarded. The retained questions

were edited and revised; the final test of their effectiveness was made on comparable (a), (b) and (c) groups throughout the United States. At least 50 experts of group (a) and 25 each of (b) and (c) were tested in the final nationwide tryouts.

Through statistical analysis of the tryout data, a final set of questions (usually about 15) was selected for operating use. For each test, a score range of three levels was provided--well informed, some information, and little information.

To illustrate the questions, a set used for bricklayers is included below.

Table 2. Oral Trade Questions--Bricklayer.

1. What do you mean by "building up a lead"? (pronounced "lead")
Building up end section (corner) of wall.
2. How often are header courses usually put in common bond brick masonry?
Every 4 to 8 stretcher courses. (Within these limits).
3. What do you set into the wall of a very deep manhole?
Manhole steps (rungs) (ladder).
4. What kind of joints do you use when plaster is to be put directly on the brick?
Cut off (rough) (vee).
5. What do you mean by "crowding the line"?
Pushing brick too close to gauge line.
6. In what position do you lay the bricks in the invert of a sewer?
On edge (rowlock).
7. What kind of course do you use in brick structure to bind the front and back walls together?
Header course.

8. What do you call a brick that has been cut in half lengthwise?

Soal (sop) (queener).

9. What kind of brick do you usually cut with a skutch?

Fire brick.

10. What do you call a brick that is laid flatwise and parallel to the face of the wall?

Stretcher.

11. What do you call a brick that is laid on the narrow edge?

Rowlock.

12. In coming to a height, if there is a course of brick difference in the level, what do you call it?

Hog.

13. What do you call a course of bricks that is laid lengthwise?

Stretcher course.

14. What do you use in the middle of a long wall to keep the line level?

Twig (twigger) (twigging) (tingle).

15. What do you call alternate headers and stretchers laid in the same course?

Flemish bond.

Interpretation

Score

Well informed-----	8-15
Some information-----	3-7
Little information-----	0-2

Probably the most extensive store of written test questions exists in the U. S. Department of Defense. The military services classify personnel into about 1,500 different occupational specialties. Although many of these specialties are peculiar to the military system, most have counterparts in the civilian economy.

Military job types have been aggregated into nine major Occupational Areas of which seven have civilian counterparts. The written tests prepared for jobs in five of these Areas have considerable applicability for use in testing for the similar civilian jobs. The job structure listed in table 3 differs from the civilian counterpart principally in the absence of tasks concerned with production and the high degree of specialization in the electronics maintenance and repair occupations.

Table 3. Military Occupational Areas with Civilian Counterparts.

Electronic Equipment Repairmen

Includes the maintenance and repair of radio, radar and electronic navigational, countermeasures, missile guidance, torpedoes, nuclear weapons control, equipment and related or allied equipment maintenance.

Medical and Dental Specialists

Includes patient care and treatment, technical and related medical and dental services.

Other Technical and Allied Specialists

Includes technical and professional-type skills not classified elsewhere such as surveying, drafting, photography, cartography, meteorology, scientific aides, physical laboratory analysis, ordnance disposal and music.

Administrative Specialists and Clerks

Includes personnel and administration, supply and transportation administration, accounting, communications center operation, and related activities.

Electrical/Mechanical Equipment Repairmen

Includes maintenance and repair of electrical, mechanical, hydraulic and pneumatic equipment.

Craftsmen

Includes forming, fabricating and installing structures and components; utilities installation and maintenance; operation of construction equipment and power tools and related crafts and trades.

Service and Supply Handlers

Includes protective and personal services, non-clerical personnel involved in warehousing, food handling and motor transportation.

Work-Sample Tests

The difficulties in constructing and administering performance tests discussed earlier have been a major hindrance to the production of such tests. Few of the work sample tests that have been developed have been adequately standardized and validated. While at this writing the number of available good work sample tests is low, it is quite likely that the near future will bring considerable improvement.

In mid-1973, under the sponsorship of a consortium of 44 states, a National Occupational Competency Testing Institute was established at Princeton, New Jersey. Operating under the long-established, prestigious Educational Testing Service, the Institute plans to make major inroads into the area of performance as well as written testing for occupational competence.

The Institute was set up as a consequence of the research project mentioned above. The project reviewed the national need for occupational testing, investigated the "state of the art" in this area, and experimentally evaluated the feasibility of establishing a consortium to prepare occupational competency tests.

While the primary focus of the Institute's effort is the preparation of competency tests for vocational/industrial teachers, the tests and associated materials developed by the Institute are useful for assessing the competence of workers in the skilled trades in general.

As of 1973, the Institute had available tests in the industries and occupations listed in table 4. These tests consist of both written and performance material. Although not all of the categories are appropriate for less developed countries, many of them could be adapted.

Table 4. Tests Available from the National Occupational Competency Testing Institute.

Aviation Industry Occupations

Airframe and Power Plant Mechanic

Automotive Industry Occupations

Auto Mechanic
Auto Body Repair
Diesel Engine Repair
Small Engine Repair

Building Industry Occupations

Air Conditioning and Refrigeration
Carpentry
Electrical Installation
Masonry
Plumbing
Sheet Metal

Drafting Industry Occupations

Architectural Drafting
Machine Drafting

Electrical Industry Occupations

Industrial Electrician

Electronic Industry Occupations

Communications Electronics
Industrial Electronics

Food Industry Occupations

Quality Food Preparation

Graphic Industry Occupations

Printing

Machine Industry Occupations

Machine Trades

Metal Industry Occupations

Welding

Personal Service Industry Occupations

Cosmetology

Technology Industry Occupations

Civil Technology
Mechanical Technology

Wood Industry Occupations

Cabinet Making and Millwork

Work sample tests have also been used in some of the less developed countries to measure competency. An example is provided by the National Industrial Vocational Training Center established by the Ministry of National Community Development and Social Affairs of the Ethiopian Imperial Government.

In their program, participants are required to perform normal occupation skills under careful test conditions. For example, the carpenter trainee is required to demonstrate his ability to construct

joints--as well as other tasks. Figure 1 is an example of a work sample test commonly employed in this program. The individual is given the tools and materials and is required to construct joints of the specified dimensions within a specified time limit. Successful completion of the tasks indicate real job competency.

There are work skill tests in use for carpentry, automechanics, plumbing, electrical equipment repair, and other skills.

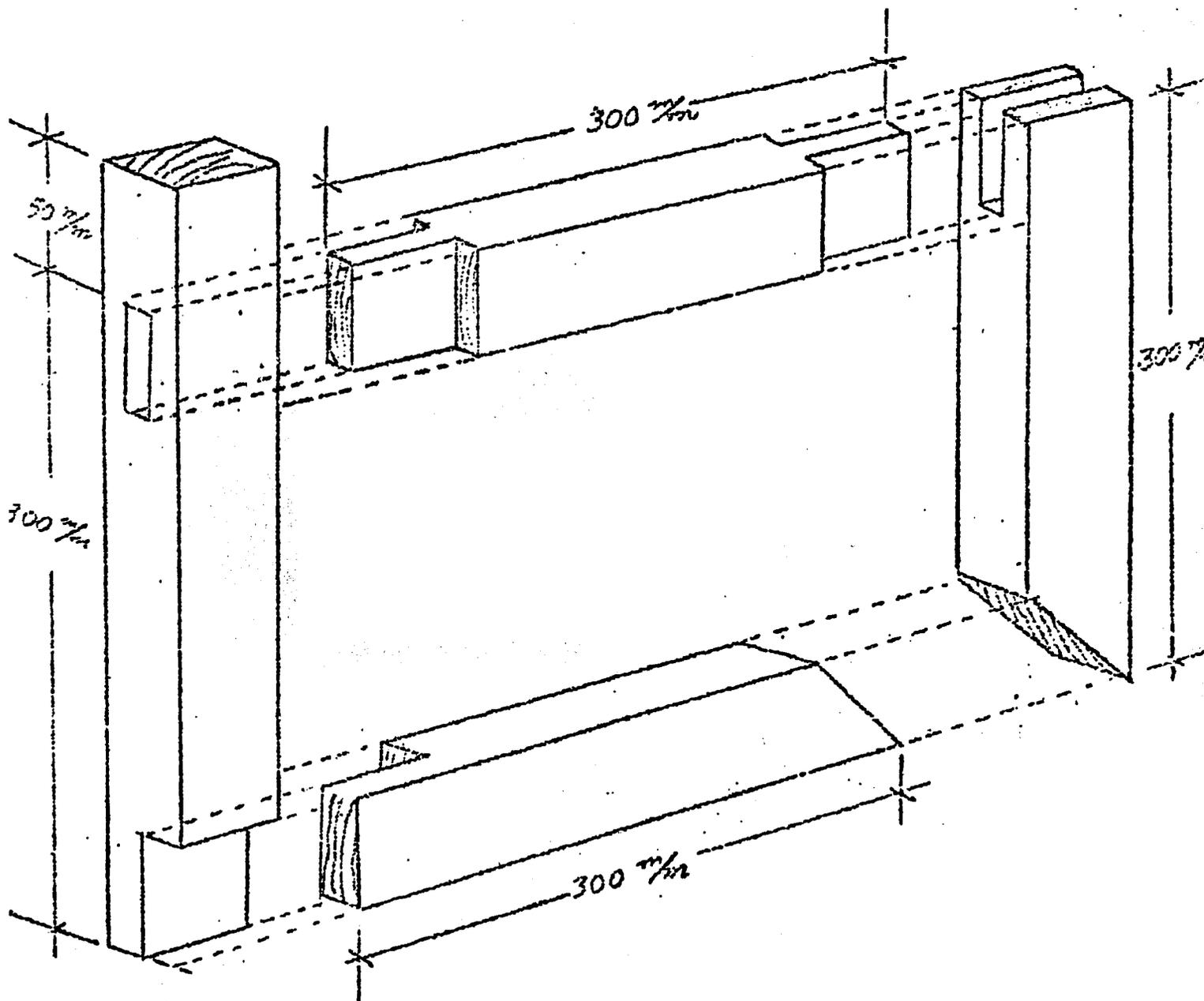
Figure 1.

CARPENTRY
(Joinery - test)

Make following joints according to the sketch.

Use 4 X 5 planned wood, glue, screws and nails.

Follow the measurement and the connection will be exactly square-formed.



CHAPTER VII

MEASUREMENT OF FUNCTIONAL COMPETENCE

Education for functional competency means providing instruction in the arts and skills required for improving everyday life. This form of education can encompass minimal amounts of formal schooling to provide basic communication skills; programs aimed at improving earning capacity through instruction in new agricultural techniques; instruction in life enhancing or extending skills such as learning simple sanitation or hygiene practices; home economics instruction; or even political or cultural courses received through some informal network. In short, education for functional living is education in practical arts and skills which enable an individual to take fuller advantage of his environment.

The emphasis in developing countries has been on education offered through traditional channels; the bulk of educational resources has been devoted to enlarging primary, secondary, and, particularly, tertiary education. As such, "fundamental education" has been sleighted. This relative emphasis has created a vacuum in the educational structure. Or to put it in a different manner: "It could well be argued that when the term "fundamental education" was dropped from the international vocabulary, half the world threw away the baby

with the bath water, and has since neglected, to a degree which would be ludicrous if the situation were not so tragic, the need to improve the competence and effectiveness, in every aspect of living, of the country folk on whom national prosperity must ultimately depend."

This chapter then is devoted to a brief description of measuring functionality by indicators, of educational programs that seek to improve functionality, and evaluation procedures which can be employed and hence output measures which can be constructed.

Indicators of Functional Knowledge and Skills

What indicators can be documented by observation in communities? Data collection often is too costly and requires skills that are lacking.

By looking at rural areas, there are some obvious features which reveal themselves to anyone taking a stroll through the countryside. These observations become a factual base for decision on new efforts to educate.

First, there is poverty. Living conditions would tend to be primitive; the degree of primitiveness may be a clue to knowledge.

Housing may be made of mud. Furnishings inside may be simple. The extent of use of available materials for housing and furnishing and for cooking materials is also an index of knowledge.

The kind of homemade clothing is easy to observe. Is the community using well the materials available?

Knowledge of sanitation practices clearly is important for health. Water obtained from rivers, lakes, and some wells may be polluted by human and animal wastes or not depending upon the knowledge about hygiene in the community.

What medical services available are used? Are the services used well or not?

Is there a scribe in the community, or are the men and women literate? Are there few books, magazines, and papers? Is there a primary school in the area? To what extent is it used?

What is the status of the application of techniques for improving methods of cultivation and animal husbandry? Are fertilizers used? Insecticides? Manure? Draught animals? Equipment? and improved methods of cultivation and harvesting? Are new crops introduced? Is the best that can be done under the circumstances in the community being done to raise food?

An Effort Toward Meeting Functional Needs

There are educational programs which try to provide functional instruction for the rural or urban population. In this section one such program, the Work Oriented Adult Literacy Project (WOALP), is examined in some detail. Such emphasis on this program is due to the fact that it is one of a very few such programs and, more importantly, it provides extensive evaluation material which is then a source of output measures.

The WOALP is a multi-faceted learning experience designed to develop functional competency in the society. Its name is somewhat of a misnomer since, while it does provide literacy instruction to adults, it teaches far more than academic skills and it teaches the literacy skills in a very different manner than other literacy programs. As far as literacy instruction is concerned, the program is centered on teaching reading, writing, and numerical skills in the framework of occupational and living skill development. Some flavor of this project is given by the following descriptive quote:

"This new approach is thus functional in its overall purpose and work-oriented in its specific direction which aims at helping the individual adult in improving his status in the sphere of earning a living as well as his style of life with particular reference to his needs for better health, better civic and social relationships and a richer sense of well-being."1/

Currently the WOALP is in operation in several developing countries, including Ethiopia, where it is embedded in the Chilalo Agricultural Development Unit (CADU) which is an experimental agricultural cooperative venture featuring the building of cooperative market practices, and experimental agricultural techniques. The WOALP was set up within CADU since it was felt that CADU would provide a well-defined rural population with well-defined needs and there would be a body of techniques, implements, etc. which would provide a valuable input into the project. However, one of the evaluation problems is separating the education content due to CADU from those due to WOALP.

Within the WOALP, the participants receive instruction on different types of wheat and barley seeds, fertilizer applications, farm tools adopted to the area, insecticide and pesticide use, and animal husbandry practices through their literacy classes, by demonstration, and through educational media such as film and radio. Thus, practical work skill instruction provides the materials for literacy instruction. Additional material is provided by information on nutrition, hygiene, political processes, and social and cultural practices.

The intended developmental consequences, including economic returns, of the WOALP are readily apparent. In brief, the project is expected to elevate the skill level of participants. The measurement of the increase in skills (or lack of it) would constitute a direct measure

1/ Ministry of Education and Fine Arts/UNDP/Unesco Work Oriented Adult Literacy Project, Functional Literacy in Ethiopia - A Pilot Experiment. Addis Ababa, 1 March 1972.

of the investment outcome of education. There is not a scale of output increases due directly to the program, but its evaluative questionnaires and interviews provide some indication of its outcomes.

The multifaceted nature of the program gives rise to a variety of indicators of progress and hence outcome measures. The evaluation processes of the WOALP involves forming indicators, and measures, of the following categories:

(1) Reading: participants are tested on their ability to read passages based on material relating to work and living skills. Criterion referenced tests are used with simple

(2) Writing: once again, material is drawn from everyday life and the test is based on accuracy in writing from dictation. Amharic, the native language, is used in all tests.

(3) Basic arithmetic: tests cover the four basic arithmetic operations: addition, subtraction, multiplication, and division.

(4) Applied arithmetic: use of basic arithmetic in real life situations.

(5) Occupational/technical knowledge: questions relate to knowing specific techniques for agriculture and home economics.

(6) Socioeconomic knowledge: knowledge of political processes as well as social conditions--including aspects of national history and culture, civics, credit and cooperation and others.

(7) Health, hygiene, and nutrition: questions generally cover practical knowledge taught in women's functional literacy classes.

(8) Attitudinal change: scales from test results can cover such specific objectives as:

- acceptance of change
- goal oriented values
- work efficiency
- community oriented activities

and general attitudes:

- activism
- participation
- empiricism
- modernity

(9) Changes in production: respondents are asked to try and evaluate or estimate qualitative and quantitative changes in agricultural yield. The best measures would be based on written records on observation of samples.

(10) Changes in number of durable goods: simple questions are used which ask if there has been investment in better tools or ownership of labor saving as life style improving goods.

(11) Changes in net global monetary income of individuals" this is a simple measure of the change in net wealth due to WOALP.

(12) Scholarization of participants' children.

Specific Outcome Measures

The categories just listed give some notion of the scope of education for functionality in the WOALP. In what follows, more detailed information is given on numbers 5 and 9. This is by way of illustration. The evaluation was performed by the administrators of the WOALP in Ethiopia and features the analysis of responses by participants to three groups of questions. The first group of questions asked of

participants indicate knowledge of improved procedures or tools. The productivity implications of the WOALP can be measured partially by the degree to which participants absorb such knowledge. The second group of questions relate to whether participants actually used the techniques to any greater extent than the nonparticipants. This is even a more direct measure of educational outcomes. The third group of questions require the participants to subjectively assess the changes in personal development and quality of life concomitant upon completing the WOALP.

To disentangle the consequences of different inputs, samples were taken of individuals of similar socioeconomic backgrounds in four groups: participants in WOALP who received inputs from CADU (PI), participants in WOALP who did not receive inputs from CADU (PNI), non-participants who received inputs from CADU (NPI), and non-participants who did not receive inputs from CADU (NPNI). The presence of inputs from CADU means individuals received demonstrations from CADU about seeds, fertilizers, and, perhaps, tools on credit. Hence, the presence of inputs implies a source of education different from WOALP. These four classifications allow the evaluation of the separate impact of WOALP.

The results relating to the first group of questions as described above are contained in table 1. The four different groups are identified by the letters PI, PNI, NPI, and NPNI. The statistical tests provide an indication as to whether the WOALP had an impact. The response differences which are being statistically tested are characterized by the letters of the two groups, i.e., the differences between participants with no input from CADU and non-participants with no

Table 1. Relation Between WOALP and Acquisition of Knowledge.^{2/}

A. Knowing the improved varieties of wheat recommended for the area	
PI - NPI	PNI - NPNI
$X^2 = 2.40$ (not significant)	$X^2 = 7.92$ (significant at 1 percent)
PI - PNI	NPI - NPNI
$X^2 = 0.66$ (not significant)	$X^2 = 9.99$ (significant at 1 percent)
B. Knowing the improved varieties of barley	
PI - NPI	PNI - NPNI
$X^2 = 16.26$ (significant at 1 percent)	$X^2 = 13.16$ (significant at 1 percent)
C. Knowing about fertilizer application	
	PNI - NPNI
	$X^2 = 6.72$ (significant at 1 percent)
D. Knowing any recommended farmtools introduced by CADU	
PI - NPI	PNI - NPNI
$X^2 = 20.30$ (significant at 1 percent)	$X^2 = 20.62$ (significant at 1 percent)
E. Knowing if there are any recommendations for insecticides and pesticides	
PI - NPI	PNI - NPNI
$X^2 = 6.50$ (significant at 1 percent)	$X^2 = 7.92$ (significant at 2 percent)
F. Knowing recommendations for animal husbandry practices	
PI - NPI	PNI - NPNI
$X^2 = 0.92$ (not significant)	$X^2 = 7.56$ (significant at 1 percent)

^{2/} Unesco Work Oriented Adult Literacy Project, "Relationship between Functional Literacy and Economic Development in Chilalo Awaraja (Arussi Province)" by Dr. B.W. Singh, Ato Sertsu Teklehaiman and Ato Laeke Abbaye, 1972, pp.8-17.

input from CADU is symbolized by PNI-NPNI. The statistical significance of the difference in responses between pairs of groups is determined by the X^2 test. Accompanying the X^2 values calculated is an indication as to whether the results are statistically significant, and at what level of confidence. For example, the results in section A (knowing the improved varieties of wheat recommended for the area) show that among individuals receiving no inputs from CADU, the WOALP had a favorable impact. The results in section A also indicate that CADU by itself (NPI-NPNI) had a significant favorable impact. Overall, the WOALP seems to be an effective source of instruction on basic agricultural methods. A possible exception is section F (knowing recommendations for Animal Husbandry Practices) where the difference in knowledge between participants with inputs and non-participants with inputs is not significant. In the WOALP report, it was suggested that the impact of CADU was responsible for the lack of difference.

The relation between these results and productivity is that knowing recommended practices may lead to their implementation and hence demonstrated productivity increasing effects. The next group of results in table 2 sheds light on the connection between participation and use of recommended practices.

The first two sections, A and B, indicate the efficacy of the WOALP concerning its investment outcomes. In both sections, the differences between participants and non-participants are significant, though at differing levels. Section C (using fertilizer as stated by the respondents), however, does not indicate any significant differences. Two explanations are that the practices engendered by CADU spread to both participants and non-participants equally and hence both groups

Table 2. Relation Between Knowledge and Implementation of Improved Methods for WOALP in Ethiopia.^{3/}

A. Using some improved tools as stated by respondents

PI - NPI

$\chi^2 = 11.04$ (significant at 1 percent)

B. Using some insecticides or pesticides as stated by the respondents

PI - NPI

$\chi^2 = 5.16$ (significant at 5 percent)

C. Using fertilizer as stated by the respondents

PI - NPI

$\chi^2 = .08$ (not significant at)

realize the value of and make use of fertilizer, and that WOALP just was not successful in this instance.

Table 3 contains the results of the overall assessment of all test groups as to changes in yields during the course of CADU and the WOALP. The results of the comparison between the participants and non-participants, both receiving inputs, are somewhat mixed. In the first two categories of response (yield up 75-100 percent and yield up 50-75 percent), participants outnumber non-participants, whereas the non-participants prevail in the categories of no increased or decreased yield. The distinction between participant and non-participant is sharper in the case where neither receives any input from CADU. The

^{3/} Ibid., pp.23-28.

Table 3. The Overall Assessment of the Use of Improved Agricultural Practices--A Subjective Assessment by the Respondents. ^{4/}

Responser	PI		NPI		PNI		NPNI	
	n=	72	n=	72	n=	36	n=	36
Yield up 75-100%	48	66.67%	40	55.56%	11	30.56%	7	19.44%
Yield up 50-75%	13	18.06	12	16.67	13	8.33	2	5.56
Yield up 25-50%	-	-	7	9.72	2	5.56	3	8.33
Less than 25%	-	-	9	12.50	3	8.33	3	8.33
Not increased	3	4.17	-	-	7	19.44	8	22.22
Decreased	4	5.76	2	7.78	1	2.78	4	11.11
Not stated	4	5.76	2	2.78	9	25.00	9	25.00
Total	72	100%	72	100%	36	100%	36	100%

subjective evaluation by the group indicates highest yields for the individuals who participate in WOALP.

The results of tables 1 and 2 indicate that the participants in WOALP acquire and use knowledge which has proven productivity consequences. Hence, such questionnaire techniques can be used to measure the investment outcomes of educational projects such as the WOALP. Similarly, the subjective assessment by the participants and the control groups provides a direct measure of the outcomes of this project.

The results of the questionnaire or interview procedure can be used in their present form to measure educational outcomes. They can also be converted into alternative, more useful, forms. An example might be to use the results of table 3 to construct expected increases in yield for each of the form groups. This implies summarizing each of the columns into a single numbers expressing the expected yield for each of the four groups.

If additional data were collected, more direct and objective assessment of the consequences of education could be made. For example, if

^{4/} Ibid., p.32.

observations were made of the use of the techniques taught by the WOALP, and these were correlated with observations of the actual increases in yield due to the different procedures, then we would have a direct and objective assessment of the educational outcome of the WOALP.

One problem with the analyses of a project such as the WOALP is that since it is a multipurpose program, it is not clear which facet of its educational product is reflected by the measures. It could be the literacy aspect, the joining of literacy and work orientation, or there may be a demonstration or Hawthorne effect. Of course, the concept of the program is that all of these parts work together more effectively than they would as separate components. Yet it is not clear that the results would not be forthcoming from just one of the parts of the entire program.

CHAPTER VIII

MEASURING ATTITUDES AND PERSONAL CHARACTERISTICS RELATED TO THE PROCESS OF MODERNIZATION

Throughout this volume we stress that human resource development is an essential part of a nation's development and modernization. Literacy and other cognitive skills as well as non-cognitive aspects of learning have been discussed. In this chapter, we analyze attitudes and characteristics of individuals that seem to have a relation to a country's rate of modernization and economic growth, showing also differing views concerning the role of the individual in development.

Although social scientists differ on whether the individual or institutions change first in the modernization process and on the manner in or degree to which the individual changes, no one denies that the individual is a factor in social and economic change. This chapter will focus on attitudes and characteristics that seem to be most effective in bringing about social change. "For in the end, it is men, and in particular their deepest concerns, that shape history."^{1/}

^{1/} McClelland, David, The Achieving Society, Princeton, N.J.: D. VanNostrand Company, Inc., 1961, p. 437.

The Individual and Modernization of Nations

Modernization is a complicated process involving changes in many areas of a nation's life pattern--a "seamless web of many strands." (Millikan and Blackmer, p. 44). The developing nations with their great differences in history, culture, and resources have widely varied experiences in development and modernization. In one country, very few people may be motivated towards development and the governing elite may have to promote attitudes favorable to development. Another country may have large numbers of individuals with attitudes and motives favorable to social, political, and economic modernization and growth, but have institutional stalemates preventing action. There is urgent need in much of the world to find ways to overcome barriers to development and eliminate poverty; consequently, there is pressure to use whatever knowledge exists about ways to accelerate modernization and growth.

A number of social scientists have sought some common elements in the process of development with the notion that elements may be instilled into a slowly developing country to assist the modernization process. More questions have been asked than answered: Under what conditions does modernization occur? What factors are important in economic development? Why do some countries with similar climate and natural resources experience far more rapid economic growth than others.

Two views provide partial answers: (1) the key to modernization lies in personality changes--changes in individuals, values and attitudes, and (2) changes in institutions and structures must be made first in order to provide opportunity and incentive for change. Those who support

the first view note that institutional changes, mass media, urban growth and other technological development do not automatically bring rapid development--that attitudes, values and motivation are more basic. Others maintain that institutional and other societal barriers hold back innovation and development; remove those barriers and general development and economic growth will occur.

Who is "Modern"?

Before one can attempt to measure those aspects of individuals that might be described as "modernistic," it is necessary to know what the aspects to be measured are. While agreement is far from complete, numerous studies of youths, workers, and elite groups in the developing nations tend to agree that certain characteristics and attitudes are generally preconditions for or accompanying attributes of modernization. A partial list of those aspects would include:^{2/}

- ability to accept change
- enterprising nature
- innovating spirit
- risk-taking
- motivation to achieve
- opinions about a wide range of subjects; acknowledges wide range of opinions in others

2/ From Inkeles
Sung Chick Hong
and others

- attitude toward time: more interest in present and future than past; accepts schedules, organizes own affairs, plans ahead
- interested and participates in civic and community affairs and local politics and is aware of political and social responsibilities
- belief in efficacy of science and medicine rather than fatalism
- shift of allegiance from traditional authority (parents and priests) to leaders of government and trade unions.

The next sections summarize briefly some measurement instruments and lists sample questions for each.

Measuring for "Modernity"

Modernism-Traditionalism Scales--While "modernism" is not necessarily opposed to "traditionalism," traditional societies and individuals are generally more resistant to change and innovation and operate within the concept of a very narrow world. Scales identifying the existence of traits related to modernization and traditionalism have been developed.

Kahl:^{3/} Activism - Fatalism--Making plans only brings unhappiness because the plans are hard to fulfill (TF).

Stratification - Social mobility--A person needs good connections to get ahead in the occupational world (TF).

3/ Kahl, J.A., The Measurement of Modernism: A Study of Values in Brazil and Mexico, 1968 Summarized in Manaster and Havighurst, p. 43.

Occupational primarcy--Determination and ambition are the most important qualities in a real man (TF).

Interpendence on relatives - Independence from Relatives--
When looking for a job, try to locate near parents even if a good job elsewhere is given up (TF).

Inkeles: Inkeles and his colleagues define modernity by a complex of traits, stressing that the development of a nation requires the transformation of the general nature of individuals and suggest that a number of influences contribute to that transformation.^{4/} To be modernized, man must develop qualities that enable him to adjust to a modern industrialized nation.

He developed a "characteristic profile" (adapted in part from Kahl) to show manifestations of modernity among cultivators, craftsmen, and industrial workers in six developing nations. This was incorporated into a "modernity test"--a questionnaire administered (individually, through an interviewer) to 6,000 young men in Argentina, Chile, India, Israel, Nigeria, and East Pakistan. The test covered attitudes, values and opinions on most major aspects of modern life.

An information test^{5/} included in the questionnaire contained such questions as:

--Identify electrical apparatus--picture of radio or tape recorder was shown

--Identify movie camera

^{4/} Inkeles, Alex, "The Modernization of Man." In Weiner, op. cit., pp. 138-150.

^{5/} Inkeles, Alex, "Making Men Modern: On the Causes and Consequences of Individual Change in Six Developing Countries," American Journal of Sociology (date), p. 215.

- Cite three or more city problems
- Identify international leader, e.g., Lyndon Johnson, John F. Kennedy, or Charles de Gaulle
- Identify local leader
- Identify Moscow
- Name three or more newspapers (or books).

On the basis of his modernity test, Inkeles lists the following as some tentative behavioral consequences of "modern" attitudes:

- joined two or more organizations
- voted often
- talked politics with wife
- contacted official about a public issue
- read newspapers daily
- scored high on geographic, political, consumer information scale.

^{6/}
Risk-Taking Scale--Measures individual propensity to take risks as opposed to seeking security. An example of questions included is:

- Which do you prefer? A job where I am almost certain of my ability to perform well.
- A job where I am usually pressed to the limit of my abilities.

^{7/}
Rigidity Scales--A number of rigidity scales may provide indications of individual ability to accept change. Items often included are:

^{6/} Manaster, Guy J. and Havighurst, Robert J. Cross-National Research, Social-Psychological Methods and Problems (Boston: Houghton-Mifflin and Co., 1972).

^{7/} Developed by Williams, 1962. Included in Manaster and Havighurst, p.47.

--need for a stable, predictable environment: I don't like to undertake any project unless I have a pretty good idea as to how it will turn out.

--conservation and conventionality: I would be uncomfortable in anything other than fairly conventional dress.

--opposition to change of judgment: It's a good idea to have a strong point of view about things because that makes it easier to decide what's right or wrong.

--opposition to change of plans: few things are more upsetting than a sudden unexpected change of plans.

--adapting to new and unusual situations: I do not like to have to adapt myself to new and unusual situations.

--learning new ways of doing things: I dislike having to learn new ways of doing things.

"Faith in People Scales." Closely related to risk-taking, these scales may provide some indication of attitudes about cooperation with others. Questions on these scales seek responses to such statements as:

--most people can be trusted/not trusted.

--would you say that most people are more inclined to help others or to look out for themselves?

--do you think most people try to take advantage of you if they got the chance or would they try to be fair?

Attitudes toward country and government may also be measured; three illustrative measures follow.

(1) National Involvement Scales could obtain information about attitudes toward:

--flag

--involvement in political life

--criticism of one's national way of life.

(2) Social Responsibility Scales (Strongly agree Disagree
(Agree Strongly disagree
(Undecided

- It is no use worrying about current events or public affairs; I can't do anything about them anyway.
- --Letting your friends down is not so bad because you can't do good all the time for everybody.
- It is the duty of each person to do his job the very best he can.
- I feel very bad when I have failed to finish a job I promised I would do.

(3) Political Participation Measures

- Keep informed
- Engage in political discussion
- Vote in elections
- Have undivided loyalty to country
- Join in public street demonstrations
- Riot if necessary to get public officials to correct political wrongdoings
- Send protest messages to political leaders when they are doing badly.

Attitude Toward Work--A research project conducted in Tunisia by Harvard University involved 400 urban workers. Attitudes toward modernization and work were analyzed through first a questionnaire interview and then a second testing using TAT and other psychological measures.

Education, income, and work history membership in organizations provided background data against which information on attitudes are to be analyzed.

Sample questions used in obtaining information about worker attitudes include:

Hamadi is a good experienced worker. Each morning his superior shows him exactly what he must do and how he must do it so that the work is well done. Do you think his superior is right?

- His superior is right
- His superior is not right

They say: "To direct/control others at work gives satisfaction." What do you think?

- Agree
- Don't agree
- Not sure

Suppose that your team has worked particularly hard this week. The directors of the enterprise (or of the administration) will allow each of you to leave either one hour earlier than usual this afternoon or two hours earlier than usual but one week later when it will be easier to arrange. Would you prefer:

- To leave one hour earlier than usual this afternoon
- To leave two hours earlier than usual one week later

What do you think of your chances for advancement and being promoted at work?

- Very unsatisfactory
- Unsatisfactory
- Neither satisfactory, nor unsatisfactory
- Satisfactory
- Very satisfactory

How often do you travel in this country, outside of Tunisia?

- Never
- 1-3 times a year
- 4-11 times a year
- 1-3 times a month
- once a week or more

How often do you read the newspapers? Watch TV?

- Never
- Less than once a month
- 1-3 times a month
- Once to twice a week
- Almost daily

To what extent are you in agreement with the following proposition?
"The man who plans for the future wastes his time for everything
is predetermined?"

- Entirely agree
- Agree
- In part, don't agree
- Don't at all agree

Intellectuals and Modernization in South Korea^{9/}

A questionnaire-interview was given to 761 South Korean professors and 754 journalists in 1966. It explored their feelings and general attitude toward their country's modernization, social change and economic and political development.

The questionnaire sought information on:

- (1) attitudes toward modernization
- (2) self perception
- (3) conceptualization of the process of economic and social development
- (4) role in public opinion formation
- (5) perceived goals of modernization
- (6) frustration and discontent (if any).

More than anything else modernization to the intellectuals means economic development, an emphasis shared by the government. Moreover, they feel religion could play an important role in modernization, and the majority believe that education in natural sciences, engineering and agriculture are the most important. They do not necessarily identify modernization with westernization.

^{9/} Abstracted from Hong, Sung Chick, The Intellectual and Modernization. Seoul, Korea: Social Research Institute, Korea University, 1967.

The professors and journalists were found to be predominantly change-oriented with tolerant, nontraditional attitudes toward social change and occupational preference. They are also predominantly present-oriented.

Some sample questions are listed below.

Self-Concept

Of the following traits, what do you think our intellectuals lack most for the modernization of Korea?

- (1) ability to accept new changes
- (2) national consciousness
- (3) cooperative spirit
- (4) an enterprising spirit
- (5) critical attitudes
- (6) innovating spirit
- (7) resistant attitudes
- (8) professional knowledge
- (9) rational judgment
- (10) spirit of participation
- (11) spirit of subjectivity
- (12) others.

Attitude Toward Modernization

The concept of modernization is said to connote the following. Which one of these do you think is most important in terms of Korean reality?

- (1) technological development and industrialization
- (2) raising the living standard of the people
- (3) democratization of political system
- (4) firm realization of national spirit of independence
- (5) growth and expansion of middle class
- (6) raising the educational standard of the people
- (7) rationalization and scientification of life patterns
- (8) others ()

Of the following preconditions for modernization in Korea, which one do you think is most important?

- (1) normalization of education
- (2) creation of new ideals
- (3) political stability
- (4) emergence of strong leadership
- (5) national unification

- (6) modernization of agriculture
- (7) long range economic planning
- (8) industrial and economic development
- (9) growth of national capital
- (10) full utilization of manpower
- (11) establishment of social security system
- (12) others ()

Under what conditions of change would you say Korea may be described as modernized?

- (1) when life has become scientific
- (2) when there are no unemployed workers
- (3) when the climate for respect of human rights has become firmly established
- (4) when equal distribution of wealth has become materialized
- (5) when the national income has reached an international level
- (6) when Korea has become industrialized
- (7) when a peaceful transfer of power has become possible
- (8) when democratization of education has become materialized
- (9) when self-sufficient economy has become realized
- (10) when the cooperation between the government and the intellectuals has become possible
- (11) when people have come to adjust to social order
- (12) others ()

Attitude Toward Occupations

Of the following occupations, which one would you recommend to your son (supposing that you have a son, if you have none)?

- (1) an occupation that fits one's own ability and aptitude
- (2) an occupation that has a promising, secure future
- (3) an occupation that pays well
- (4) an occupation that can help others
- (5) an occupation that enables one to use his originality and creativity
- (6) an occupation that is respected by others
- (7) others ()

If a job is available for your daughter (supposing that you have a daughter, if you have none) after her graduation from a college, how much would you be in favor of her working as a professional woman?

- (1) I would agree with her working until she gets married
- (2) I would agree with her working not only after her graduation but even after she gets married
- (3) I would not agree with her working even after her graduation

Achievement Motivation

Still another characteristic of individuals that appears to have a bearing on development and particularly on economic growth is the "need to achieve."

After much research, McClelland and others developed the hypothesis that the need to achieve (n Ach) is an element in economic activity of both individuals and nations (or communities). It is not enough to have know-how and skill training; an individual needs at the same time to be motivated to use those new skills and techniques. Throughout history in each country where unusual economic growth occurred there appeared to be certain common characteristics among individuals within the business community--characteristics related to the need to achieve.^{10/} Some of the manifestations of entrepreneurial are shown in Exhibit 1.

^{10/} McClelland indicates that his hypothesis is similar to Weber's: that there is a relationship between Protestantism and the rise of capitalism. Weber laid the groundwork for efforts to understand the social and psychological foundations for economic growth and development and pointed out ramifications for society of value training (especially related to independence and self-mastery) in individuals. The Achieving Society, op. cit.

Exhibit 1

ENTREPRENEURIAL ROLE BEHAVIOR^{11/}

Moderate risk taking (a function of skill, not chance)

Decisiveness

Energetic, innovating activity:

works hard

works long hours

tries to do things in new and/or better way

Individual responsibility

Knowledge of results of decisions

Organizational abilities

Long-range planning

^{11/} Adapted from McClelland, The Achieving Society, p. 207.

Measuring Need for Achievement Levels

McClelland and his group developed a measure for need for achievement--a way of scoring stories written about some of the pictures used in the Thematic Apperception Test. Then a count of the number of ideas related to achievement was used as the score of the need for achievement. Several studies were made of achievement levels among groups.

(1) Stories or fantasies were used to demonstrate to what channels people's thoughts turned under pressure or without pressure. A high n Ach score was a good predictor of a better performance in a working situation for one who scored high was more active, more concerned about doing a task better, learned as he went.

(2) Studies were made of motives and other behaviors of 750 business entrepreneurs in the U.S., Italy, Turkey, and Poland to determine if successful businessmen had higher n Ach levels.^{12/} Business managers in every country except Turkey were generally found to score high in n Ach tests.

(3) Results of an achievement motivation training experiment for adults in a developing country were measured.^{13/} A cross section of men who had significant positions in business life in two small cities in India were trained. In one town, Kakinada, training was given to 52 men in four courses in 1964. In the other town, Vellore, 26 men were

^{12/} Study was based on "need achievement scores" on a test given to business managers and professional persons. A series of pictures were presented; those tested wrote stories about the pictures; stories were scored on the basis of the number of ideas related to achievement.

^{13/} McClelland, David and Winter, David G., Motivating Economic Achievement, New York: The Free Press, 1969.

trained in 1965. Participants' performance before and after training was compared with control groups' performance to determine whether training had an effect on individual effort and on community business expansion.

Measurement and evaluation of course results were conducted by interviews and case studies of trainees at six-month intervals over a period of two years after the course. In addition to measuring the outcomes of the training, the interviews and follow-up contacts served as a retraining and reinforcement of former training. Specific questions were asked of participants and the control group members over a period of two years to obtain fairly detailed information about their firm and their role in changes, problems, and plans for the firm.

Trained participants were found to be more active, attempted and actually started more new ventures, mobilized increased amounts of labor and capital, and tended to be responsible for relatively larger percentages of increases in gross income of their firms than were control group members.

The following table shows the increase in activity ^{14/} levels of participants as compared to control groups. ^{15/} Generally, those trained were working harder and, in spite of governmental inertia, had more success expanding their businesses than those in control groups.

^{14/} Activity is defined as planning and/or taking steps to invest in or establish a business.

^{15/} McClelland, Motivation for Achievement, op. cit., p. 213.

<u>Percent of Participants who Increased Activity</u>	<u>Before Course 1962-1964</u>	<u>After Course 1964-1966</u>
Participants in <u>n</u> Ach training	18%	51%
All controls	22%	25%

Increased achievement motivation showed up in the following economic measures:

- Hours worked -- at the end of the two-year follow-up twice as many participants reported working longer hours after the course than before.
- New firms -- between 1964 and 1966 almost one trained man in four started a new business (increase from 4 percent to 22 percent); controls remained at about the same level (7 percent to 8 percent).
- Capital invested -- about 1/3 of all businessmen made specific investments; after training that proportion rose to 3/4.
- Labor employed -- participants employed greater numbers after training than controls.

Other Elements Affecting the Individual's Role in Economic Development

Support for the "McClelland hypothesis" is by no means unanimous. Other psychologists have noted that: (1) the belief that achievement motivation is a key factor in economic development is an oversimplification and that other drives and motivations are also involved, (2) n Ach in individuals is not necessarily the same thing as n Ach in a society, and (3) we do not yet understand the cultural, political, economic and individual interrelationships involved in changing society or in

modernization. We have already noted that a number of economists and others maintain that the first step in modernization is to remove the institutional barriers that impede the search for new solutions and new techniques, and to provide opportunities and incentives for accelerated economic growth.

One economist points out that some countries have substituted other elements for modern entrepreneurial skills, or at least have been able to offset the inadequacies of individual entrepreneurs by splitting the entrepreneurial function.^{16/} In Germany in the last half of the 19th century, for example, investment banks supplied capital and participated or led in making the industrial, locational and innovative decisions necessary for economic development. Slightly later in Russia the imperial bureaucracy was the entrepreneurial force (along with imported entrepreneurial talent). In each instance as industrial growth occurred the accompanying industrial transformation served as a training school for entrepreneurs.

^{16/} Gerschenkron, Alexander, "The Modernization of Entrepreneurship." In Weiner, op. cit., pp. 246=257.