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Education and the Development of Human Technology

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INTRODUCTION

IN RECENT YEARS there has been a marked increase in the output of literature linking economics with education. In the past, most of the professional literature in this area dealt either with educational finance (the economics *of* education) or, in a general way, with the role of education in economic development. Current literature continues to deal with these two fields, but in such a way as to introduce a new field, or at least to direct attention to new uses for materials developed in the two fields.

If indeed there is a new field, it might be termed "educational policy and practice as an instrument for promoting economic development" or "the use of planned educational growth to promote economic development." The approach, generally stated, ascribes a causative role to education in the development process. As stated in the *Summary Report* of a recent Organization for Economic Cooperation and Development (OECD) conference:

> Deeper understanding of the forces affecting long-term economic and social progress is leading to recognition of the fact that investment in education is an indispensable prerequisite of future economic growth.[1]

Official United States recognition of this relationship is implied in section 211(b) of the Act for International Development of 1961.

> In countries and areas which are in the earlier stages of economic development, programs of development of education and human resources through such means as technical cooperation shall be emphasized, and the furnishing of capital facilities for purposes other than the development of educational and human resources shall be given a lower priority until the requisite knowledge and skills have been developed.[2]

Successful implementation of this section of the act will depend upon a number of factors, not the least of which is the validity of the basic assumptions on which it rests:

1. That "experts" can now make recommendations in the field of educational policy and practice which will produce reasonably predictable increases in the productivity of the economy in an underdeveloped country;

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[1] Organization for Economic Cooperation and Development. *Policy Conference on Economic Growth and Investment in Education: Summary Report.* Washington, D.C.: OECD, October 1961. p. 1.

[2] Act for International Development of 1961. Public Law 87–195, S. 1983, Sept. 4, 1961. p. 4.

2. That "the earlier stages of economic development" are readily distinguishable from stages where "the requisite knowledge and skills have been developed";
3. That one can identify, define, and impart the "requisite knowledge and skills" for any given underdeveloped society;
4. That the basic deficiencies which cause underdevelopment have been identified and are understood; and
5. That the United States has, or can quickly develop, the "technology" to overcome these deficiencies.

Development is change; planned development is planned change. The planning function in a society, be it in political, economic, or social fields, is based upon the ability to predict and/or anticipate, which, in turn, is based upon an understanding of existing social, political, and economic forces and the ways in which they will act, react, and interact to a proposed set of parameter values and/or variables. A planner must have a keen sense of awareness of the current status of the objectives of the society, and how it is possible to arrive at the intended destination. However, objectives are relative; once achieved, they make possible new objectives by increasing the society's capacity to develop. Thus, objectives in the planning process are both ends and means to further ends, which, in turn, become further means, ad infinitum.

The planner's own ability, his understanding of the environment in which the plan must operate, the technology available to him, and the quantity and quality of information to which he has access are prime factors in the formulation of a feasible plan.

TESTING THE BASIC ASSUMPTIONS— A CONCEPTUAL PROBLEM

The term "underdeveloped country" which has been used with ever-increasing frequency in the postwar period is an ambiguous one. As most commonly used, it refers to a country that is making substantially less than optimum use of its available resources at a given level of the arts and sciences. This implies the existence of an internationally recognized and internationally valid level of the arts and sciences which can be used as a yardstick. The weakness of this basic assumption lies in the fact that the term "arts and sciences" includes the social sciences.

Technology, for the purpose of this discussion, refers to applied science; i.e., the application of scientific knowledge to one's environment for the purpose of altering its form, substance, or the way in

which it is used. The term "social science technology" refers to knowledge in the social sciences applied to one's social environment for the purpose of altering its form, substance, or the way in which it is used. Unfortunately, the pool of international technology in the social sciences is considerably smaller than in the physical sciences and is replete with cliches, slogans, value judgments, and the like which cannot withstand the test of objective research.

Stated in general terms, technology is a product of man's individual and collective response to his environment. Through time, particularly since the advent of the industrial revolution, technological advance has resulted in what might be referred to as a "cultural" or "social" lag or gap. The application of physical science alters the environment to which society must respond and the response produces new technology. Thus, while changes in the physical environment are wrought by physical science in a revolutionary way, society is expected to respond to such revolutionary change in an evolutionary manner. Man has thus far been exceedingly reluctant to employ social science technologically; i.e., to apply knowledge in the social sciences to his social environment for the purpose of altering its form, substance, or the way in which it is used. The principal technological uses of the social sciences have been in fields such as criminology where the objective is primarily that of maintaining a degree of uniformity in man's response to his social and physical environment. Viewed in this light, the technological applications of the social sciences have tended to be for the purpose of maintaining the status quo, whereas the technological applications of the physical sciences have been for the purpose of promoting revolutionary changes in man's physical environment.

Physical science is amoral and essentially free of ideological content. With few exceptions, the social sciences are moral and are seldom separated from ideology. They examine mores and folkways, patterns of behavior, and value systems, but they tend to emphasize the differences or the distinguishing features of social systems and attitudes. Physical science and its technological applications enable man to describe and to study his physical environment and to put it to new uses. The social sciences have made it possible to analyze and describe certain aspects of man's individual and group behavior. There are, however, strong moral values, particularly in Western liberal democratic systems, which oppose the application of scientific knowledge gained through social studies for the purpose of imposing social change. This has resulted in a "clinical approach" which describes a social problem symptomatically and proposes possible cures for the symptoms within a context of social morality. Although many studies may seek out the origins of the problems under investigation, the social scientist who violates the social morality of his

system and proposes *induced* deviation from an accepted norm is usually labeled a "revolutionary." As an example, it may be considered scholarly to study the problems which are attributable to the institution of monogamy; but it would be considered revolutionary to advocate the dissolution of a socially accepted system of marriage because of its adverse social consequences.

Returning to the problems of underdeveloped countries, there has been a tendency to concentrate on technical assistance from economically more developed countries as a means of raising the level of the arts and sciences to promote economic development. One of the goals of virtually all underdeveloped countries, as noted in the numerous official statements of their governments, is to compress 100 or more years of economic growth into 20 or 50 years. If these countries are to succeed in this venture, it would seem that the physical science revolution/social evolution pattern must be altered in such a way that social changes can take place concurrently with, or even in advance of, changes in the physical environment. In other words, a social science technology must be developed.

Physical science technology is no private domain from which certain countries are excluded. An atom can be smashed in Japan, Afghanistan, the Soviet Union, or the United States with identical results. But few social institutions can be expected to function in all societies; those that do are unlikely to function in the same way and are less likely to produce the same results. Nor, for that matter, will nuclear science technology be utilized in the same way by all societies.

There may be considerable validity in the argument that the colonial system restricted access of the indigenous society to the international pool of physical science technology. In some colonies, however, few of those who were allowed this access by the colonial power actually used their knowledge to increase the productivity of their economy—for example, the doctors and lawyers who did not practice and the engineers who did not build or design. If colonialism were the only barrier between a country and the technology needed for development, the current underdeveloped state of the economies of China, Thailand, and the Latin American countries would be difficult to explain.

The principal reasons for underdevelopment are to be found in man and society. Two different societies may have virtually identical manpower units in terms of skill, age, knowledge, health, energy, etc.—but may employ them for quite different ends, or in different ways to achieve the same ends. For this reason, the development of high-level manpower becomes less important than developing the social technology which determines the uses to which human resources will be put.

To reconstruct the problem, there are a number of countries in the world where there appears to be a considerable gap between actual production and the optimum production which should be possible at the current international level of physical science development. However, the level of development in a given country is determined by the level of its arts and sciences, including the social sciences. Local or national utilization of internationally available technology depends upon the capacity of the social order to make use of it.

The United States and other more developed countries have professed concern over the economic state of the less-developed countries and have attempted to assist them in various ways. In general terms, the initial approach in rendering aid relied heavily on capital, but there has been a growing realization of the role of the human being in the developmental process. This new trend is exemplified in the current emphasis on the role of education in the development of human resources. However, the international applicability of the social assumptions of most of the literature thus far produced remains to be demonstrated. Current planning seems to concentrate on the training of individuals as manpower units, assuming that these human resources will be utilized in an underdeveloped country in the same way as in a more developed society.

Current technical assistance programs of the Western powers provide the individual with skills and knowledge which equip him to perform a function, but they do not provide the society with the knowledge and concepts which will enable it to make the best possible use of the trained individual. It should not go unheeded that persons from underdeveloped countries who are trained under a Communist system are given the skills and knowledge to perform a task, *plus* a social and political plan of action for bringing about a society which is supposed to make efficient use of its new abilities.

It may be at its own peril that the West continues to ignore the crucial importance of a *plan of action* in addition to human skills and capital as factors contributing to economic development. However, the immediate pitfall is to attempt to transplant readymade social and political systems in alien soil. For this reason, the plan of action directed to the individual would consist primarily of developing his ability to transform ideas or plans into action. This methodology would then be applied by the individual to his own environment, according to *his* political and moral values, and should substantially increase his value as an employee, as an individual citizen, and as a member of his own political party. Properly executed, the transfer of such a methodology should increase the underdeveloped country's capability to transform the idea of development into the action necessary to bring it about.

The absence of a sizable pool of internationally transferrable social technology may be the chief bottleneck in promoting economic development through foreign assistance. This deficiency affects the developed country's efforts to aid as well as the receiving country's attempts to utilize the proffered assistance. The given country finds it difficult to adapt its aid to the social system in the receiving country. An examination of Western professional literature on the problems of conducting successful foreign assistance programs supports this statement. Most contemporary writers identify various social problems in underdeveloped areas, such as excessive status motivation, or the near absence of socially acceptable economic motivation. However, there is often a tendency to formulate plans of action for promoting economic development based on assumptions which shift the country one or more steps above its current level of development. For example, an economist may recommend that economic motivation be used to repair imbalances in the economic structure caused by an apparent near-absence of economic motivation. Another expert may advocate intensive educational programs for training high-level manpower when the society cannot make efficient use of its current supply of trained manpower. It is not intended to imply that high-level manpower is not needed in underdeveloped countries, but one cannot predict with any accuracy what effect the introduction of new units of trained manpower will have on the economy until he knows how they will be used. The principal reason that the society is underdeveloped is that it has not made efficient use of the resources already available. Trained manpower is one more resource which can be misused, or go unused, quite as easily as capital and natural resources if the society has not developed the social technology to put them all to more efficient use.

HUMAN TECHNOLOGY

The current emphasis on utilizing educational planning as a means of promoting economic development may be realistic in principle, but it presupposes a knowledge of the changes that should be made and how education can bring about those changes. If the role of education is conceived as that of training manpower, there is an additional assumption that present-day experts can anticipate the manpower needs of future generations in an alien society. This is quite impossible unless the experts can predict how the society will make use of its human and physical resources. Plans made at the present time appear, in many cases, to be based on assumptions that the underdeveloped countries will somehow, magically, discover the most efficient ways of utilizing their resources.

It has been suggested that a "strategy of human resource development" [3] be perfected. Although this strategy is a component of human technology, the term "human technology" has been selected because it encompasses both the development of human resources and the social technology which enables the society to make efficient use of these resources. A valid theory for the development of human technology must discover those functions which appear to be essential for the maximum utilization of resources in any society. The value of such a theory will depend heavily upon the degree to which it can be disassociated from system-oriented morality. The idealistic or moralistic approach must be avoided in order to dig beneath "inalienable" rights which are, in fact, alienable; "human nature" which is not natural in all social contexts; "basic" assumptions which are not basic; and other system-oriented cliches whose universality is questionable. This is absolutely essential because the theory will be used to examine diverse social structures and value systems in an attempt to discover the crucial functional bottlenecks which prevent the maximum utilization of available human and material resources.

Developing Human Technology

The validity of a theory for developing human technology will depend upon the accuracy of the analysis on which it is to be based. Accurate analysis requires significant, comparable data collected from a broad base.

A modest, but significant beginning has been made in the collection of data. Two recent examples, in addition to a number of UNESCO studies, are the *Atlas of Economic Development* [4] and the Svennilson, Edding, and Elvin paper which was presented at the 1961 policy conference of the OECD.[5] Both of these studies set good methodological examples. Their shortcomings can be attributed to three principal deficiencies, none of which is the fault of the authors:[6]

1. The shortage of accurate data in categories recognized as significant;
2. The internationally incomparable nature of much of the data now available; and

[3] Frederick H. Harbison. "The Strategy of Educational Development in Relation to the Economic Growth of Underdeveloped Countries." Unpublished paper presented at the OECD Policy Conference on Economic Growth and Investment in Education held in Washington, D.C., Oct. 16–20, 1961.

[4] Norton Ginsberg. *Atlas of Economic Development.* Chicago: University of Chicago Press, 1961.

[5] Ingvar Svennilson, Friedrich Edding and Lionel Elvin. "Targets for Education in Europe: A Study of Policy Considerations Related to Economic Growth." Unpublished paper presented at the OECD Policy Conference on Economic Growth and Investment in Education held in Washington, D.C., Oct. 16–20, 1961.

[6] See UNESCO. *Manual of Educational Statistics.* Paris: UNESCO, 1961, for a more detailed study of the numerous problems involved in the collection of internationally comparable educational statistics.

3. The fact that data are not collected on an international scale in categories which would appear to be significant.

There is a shortage of accurate data, particularly for the less-developed countries. Current population figures are often estimates based on censuses of varying reliability taken 20 or 30 years ago; national income and gross national product figures are usually, at best, educated guesses, as are figures for average caloric intake, rate of population growth, etc.

The fact that the data collected are not comparable is illustrated by the efforts of UNESCO and others to express total school enrollment as a percentage of children of school age. International demographic statisticians appear to have decided on 5-year cohorts as logical subdivisions of national population. Thus, international tabulations of population statistics are broken down into 0–4, 5–9, 10–14, 15–19, 20–24, etc. age groups. National school enrollment statistics are usually reported by major levels of education; i.e., primary, secondary, and higher education. They are reported by school year in only a few countries.

A pressing current problem is that of selecting internationally appropriate, "standard" age cohorts for primary, secondary, and higher education levels. At present, one can only compare primary systems ranging from 4 years to 8 years in length to "standard" cohorts of either 5 or 10 years. Since the population statistics are usually estimates and may be inaccurate, the school enrollment ratios resulting from such a comparison may be as much as 100 percent in error. For example, Ginsburg[7] uses the UNESCO figures which report that Thailand's primary school enrollment was 54 percent of the age 5–14 cohort in 1958. Primary school in Thailand is of 4 years' duration with compulsory attendance beginning at age 8. Expressed as a percent of either the 5–9 or the 10–14 age cohort, the 1958 primary enrollment ratio would exceed 100 because of the large number of holdover students. When one adds the further statistic that, as of 1960,[8] approximately one-third of Thailand's population in all age groups above 8 years had no schooling, it becomes difficult to develop a statistical picture which is significantly comparable on an international basis.

The fact that data are not systematically collected on an international scale in categories which would appear to be highly significant presents a major research problem in the development of human technology. There is a shortage of valid indexes which show apparent correlations or a degree of coincidence between the phenomena of underdevelopment and specific variables; thus, there is little infor-

[7] Ginsburg, op. cit., p. 42.

[8] A preliminary estimate based on the first releases of the 1960 census figures. The one-third with no schooling was more or less constant in all age groups, not confined to the older population.

mation to guide the researcher to the most fertile fields for further investigation.

The development of human technology will depend upon the successful formulation of a methodology for inducing functional change in a society or a group of societies. Basic to such a methodology is a valid, functional theory of economic development. Such a theory should identify social, economic, and political functions and classify them as essential, conducive, or obstructive to the economic developmental process. These functions might be categorized as follows: reward and motivation, coordination, evaluation, training, distribution, saving and investment, leadership, etc. The leadership function should include the role of personality in influencing various other functions as well as the extent to which this influence is prevented by social and/or political pressures. The role of the individual is of great importance in formulating foreign aid policy because it is indicative of the overall effect to be expected from a program which attempts to influence mass behavior and institutional development through the activities of individuals—i.e., through trained high-level manpower.

The functional theory should make possible the determination of the apparent maximum change potential of a given society and its probable change potential. It should also make possible a reasonably accurate assessment of the minimum institutional change requirement for reaching the takoff stage en route to economic development. By applying the theory, the planner should also increase his capacity to predict the probable results of proposed changes. This comprehensive theory can best be developed through a team approach that first collates existing studies.

The Role of Education

It can be truthfully stated that education is an indispensable prerequisite of economic growth, provided one uses the broadest definition of the term "education." However, broad definitions are of little use to planners when dealing with specifics. To prescribe education as a cure for economic underdevelopment is even less precise than prescribing medical science as a cure for the common cold.

The functional theory of economic development, by identifying those specific functions which appear to be essential for economic development, should make possible the identification of specific unfulfilled needs which demonstrate a tendency to impede economic development. Another essential tool for educational planning related to economic development is precise information on the contribution of education to the developmental process. This information should be obtainable through comparative education research. Studies

should be made of educational systems and philosophies in a number of countries at various levels of economic development. Historical studies should also be made, comparing rates and levels of educational development to economic development in the more advanced countries. Analysis of the results of these studies could produce another type of functional theory—a theory which would relate specific types and functions of education to certain social, economic, and political functions which appear to be essential or desirable for promoting economic progress.

If these two functional theories, both general and specific, can be developed, the basic assumptions underlying the use of educational planning for promoting economic development will become sound ones.[9] This presents what should be a high-priority task—that of collecting, analyzing, and synthesizing the results of previous studies before embarking on new research programs. A great deal of research has already been done which should be of value in the formulation of the theories. Significant analyses of the processes of economic, political, and social change, similar to the study *Economic, Social, and Political Change in the Underdeveloped Countries and its Implications for United States Policy*,[10] contain valuable information which should be utilized.

EDUCATIONAL PROBLEMS

The following section on selected educational problem areas which appear to be of primary importance in developing and applying a functional theory in education is intended to suggest a few hypotheses which may or may not be substantiated by subsequent research. However, before exploring specific problems in selected educational fields, some reference should be made to overall problems which touch upon the whole area of educational planning as an instrument for promoting economic development.

Political considerations cannot be ignored. In public education, financing, standards, administration, and structure (in fact, the very existence of a system of public education), are contingent upon political decisions. Therefore, an understanding of the political system in an underdeveloped country is essential. Some of the political questions that must be considered in assessing a given country's prospects for economic growth are: (1) The extent to which the government is representative of and is respected by the governed;

[9] Supra, p. 2.

[10] Center for International Studies, Massachusetts Institute of Technology. *Economic, Social, and Political Change in the Underdeveloped Countries and its Implications for United States Policy.* Prepared at the request of the Committee on Foreign Relations, U.S. Senate, 86th Cong., 2d sess. Washington: U.S. Government Printing Office, Mar. 30, 1960.

(2) the extent to which the government is technically and administratively competent; and (3) whether the principal goal of economic development is to maximize state power or to maximize benefit to the individual.

There is a tendency in some of the professional literature concerning underdeveloped countries to refer to "politicians" and the "intelligentsia" as two separate power groupings, and further, to ascribe a positive or leadership role to the latter and an obstructionist or negative role to the former. Such distinctions are unrealistic in many of the less developed countries where the bulk of the intelligentsia hold positions of political leadership, either in support of, or in opposition to, the government. This may make educational planning easier because of the intelligentsia's presumed recognition of the value of education, or it may make it more difficult if, as the political in-group, the intelligentsia hopes to maintain itself in power by controlling access to education.

The problem of relating desirable ends to means is ever present in developed and underdeveloped countries alike. One of the justifications for the current "new look" at the role of education in promoting economic development is that it should enable a country to invest its scarce resources in education in such a way as to maximize economic benefit. Thus, the new approach tends to emphasize economic criteria as the basis for setting priorities in educational investment.

Value judgments play a dominant role in the allocation of resources in a society. A major weakness of market economics is its limited ability to measure value. According to economic theory, only "goods" (and services) are produced—there is no term for economic "bads." Furthermore, reliance upon the market price as representing the true value of a good (or service) to an economy assumes that a painting, a university, and a horseracing track, each of which may bear the same price tag, are of equal value to the society. A more realistic picture of relative social value may be determined on the basis of utility cost to the individual. For example, two persons, A and B, each purchase one painting. A pays $50,000 for a Rembrandt original and B pays $25 for a print of the same painting. What is the total "value" of the paintings to the society? Expressed in terms of market economics it is $50,025. In utility value terms, the two paintings may be of more nearly equal value, especially if A's total resources were, say $100 million and B's were $200. If A's utility preference for dollars is 1 percent and B's is 100 percent, the two paintings would have utility values of $500 and $25 respectively, or a total utility value of $525 *vs.* a $50,025 market value.

Utility value may also be a pertinent concept in the acceptance of new ideas. It would seem quite possible that within a society in a state of turmoil, where social and cultural values no longer provide

solutions to the everyday problems of existence, individuals might see a higher utility value in new ideas and techniques than would individuals in more stable societies. It is possible that this phenomenon is a factor in the self-generating process of growth, i.e., once the process of change is started, new innovations will create further social (and economic) disequilibrium which makes the society more prone to accept further change by decreasing the utility value of maintaining the status quo.

Restated briefly, social value judgments play a dominant role in the allocation of material, human, and technological resources. These judgments may be based upon utility value which is seldom measurable by market economics. Measurements of national product which rely upon the market system to set values do not present a true picture of the utility value of production in a given country. This is particularly true in education where value is measured (economically) by the volume of input.

International standards pose a particular problem in the field of education which is, in a sense, related to utility value. There is, somehow, an aspired to, though often unspecified, set of standards for literacy, as well as for secondary and higher education. The standards are usually more specific in professions like medicine and engineering. If such a standard were to imply that a minimum of 6 years of higher education is necessary for a medical doctor, it would assume that these 6 years have equal utility value in all societies. However, in some underdeveloped countries it may be possible to train a much larger number of medical technicians or midwives for the same investment as that required for training a small number of "internationally qualified" doctors. If the additional 2 years of training of the doctor have little utility value in terms of the work he is required to do, there will be greater benefit (and a higher utility value) if scarce resources are used to train technicians, thus producing in a shorter time a larger body of persons whose training can be well utilized under existing conditions. In spite of the utility value of a particular kind of training, the pressure of the international standard may result in an uneconomic allocation of resources in education, if only for prestige reasons. Few countries wish to acknowledge that their educational system does not produce graduates who meet an international professional standard.

SPECIFIC PROBLEM AREAS

Certain problem areas may assume strategic as well as tactical importance in the educational planning process as it attempts to promote economic development. Their strategic importance will be deter-

mined by their position on the relative scale of functional values in formulating the functional educational theory. Their tactical importance will depend heavily on their relative utility value within a given country. The results of subsequent research may minimize the importance of some of the areas, but that cannot be determined at this stage. Although economic criteria are emphasized, it is not implied that they are to be used exclusively in the planning process.

Literacy

When a detailed, precise communication is desired, the printed word is probably the most efficient, *provided* that all parties to the communication are literate. It is obvious that a modern industrialized society could not be developed in a country where there is no literacy.

> The ability of people to mobilize themselves for productive purposes, to acquire knowledge, and to circulate ideas is of necessity a function of their level of communication. Literacy is perhaps the most basic simple measure of communication. . . .
>
> There are, to be sure, means of communication other than written. The oral tradition, for example . . . but word-of-mouth transmission . . . is associated with distortion and misunderstanding.[11]

The question which the planner must answer satisfactorily is not *whether* literacy is essential to economic growth, but *how much* literacy is essential for economic development. In order to answer the latter question, the planner must develop a correlation between apparent rates of economic growth and literacy rates. While a survey of the current world situation might indicate that high literacy rates accompany high levels of economic development, it is equally obvious that literacy rates were much lower in the European countries during their unprecedented growth at the time of the industrial revolution.

Unfortunately, the "international value standard" has clouded the picture to the extent that the percentage of literacy is often used as one of the indicators of economic development. Thus, a high prestige value is attached to achieving a high rate of literacy. The task of the planner is to discover its utility value.

The value of literacy to the individual and to the state is not denied, but many who would promote literacy for its intrinsic "goodness" live in areas or countries where the mere acquisition of literacy will make accessible an already abundant supply of literature. In such societies, the utility value of literacy is quite high. However, what is the utility value of literacy in the remote regions of some underdeveloped areas where there is virtually no access to the printed word, or where the langauge used in daily life may not yet have a written form? In the absence of an accompanying effort to increase the availability of read-

[11] Ginsburg, op. cit., p. 38.

ing material, the utility value approaches zero. In fact, experience in some countries has already shown that if the teaching of literacy is not followed by a continuous flow of graded reading material, most of the persons so taught will again become illiterate within a short time. For this reason, the total cost of eradicating illiteracy is far in excess of expenditures for teaching. Reading materials must have utility value beyond that of merely maintaining literacy and must be prepared by writers who are already in short supply. The materials must be printed using scarce supplies and facilities and they must be distributed through outdated and already overtaxed transportation systems serving isolated areas. The cost of maintaining literacy may be much greater than the cost of teaching it, and the resources required might have a higher utility value elsewhere. For example, resources expended for writing and printing elementary reading materials for new literates might better be used for producing modern texts and reading materials for an expanding public school system.

Among the criteria for developing literacy which would appear to demand consideration in the planning process are:

1. A schedule of the total resource commitment required for teaching literacy up to certain levels including the cost of training teachers, preparing teaching and followup materials (publishing, writing, and material costs), teachers' salaries and maintenance costs, and transportation costs for teachers and materials;
2. A schedule of apparent economic benefits to be derived from various literacy rates; and
3. An understanding of and an appreciation for the benefits to be derived from literacy which may be only secondarily economic.

Obviously, a number of factors can influence the planner's calculations of the total resource commitment—the size of the country, population density and distribution, topography, etc. Thus, a small, reasonably integrated country may be able to achieve a higher rate of literacy than a larger, or less integrated country though each utilizes the same proportion of its available resources for the teaching of literacy. Point No. 3 allows for the political objectives of literacy, such as promoting national unity, encouraging individual participation in elections and other political decisions, and for the social objectives of equalizing educational opportunity.

The planner should resist prestige pressures to achieve a high literacy rate in the shortest time possible and base his judgments upon more rational criteria. It would appear that, at some point, literacy becomes more a consumer good than an investment—or an investment whose marginal return approaches zero. If conceived as a consumer good, refraining from consumption can serve as a form of investment, the magnitude of which is determined by the resources

it releases for other uses. The consumption of literacy can then be included among the other consumption goals of economic development.

Language Problems

Associated with the problems of literacy are those of language. The utility value of literacy will depend somewhat upon the utility value of the language in which the person is literate. Of what utility value is literacy in Arabic to an Indonesian if the lingua franca of the area is Indonesian? Of what value is literacy in a local dialect if little or no written information is exchanged in that dialect?

Another aspect of the language problem is perhaps more controversial, comprising two closely related subproblems: (1) What should be the language(s) of instruction in the public education system; and (2) to what extent should foreign languages be taught in the school system?

In virtually all of the underdeveloped countries that have recently achieved independent status, the language of instruction, particularly on the secondary and higher education levels, is the language of the former colonial power. In many of these countries, the government continues to be subjected to strong pressures to nationalize the language of instruction. There are valid arguments both for and against such a move.

Proponents of nationalization will argue that the use of a foreign language tends to favor students coming from elite groups where the foreign language is spoken in the home rather than students who come from lower class families who must learn their foreign language in school. They argue further that the creation of a national unity or consciousness is not promoted by reliance upon an alien language for instructional purposes. It is also pointed out that reliance upon a foreign language in the educational system restricts the development of the national language.

Arguments in support of retaining the foreign language point to the high cost of translating textbooks and other educational materials into the national language. They also note that a failure to translate such materials would deprive national students of access to vast stores of knowledge, particularly in technical fields. It is further argued that this translation process would have to continue over a long period of time until the nation's scholarship became sufficiently developed to originate and produce its own material rather than relying on foreign sources.

There is another aspect of this problem which has not received as much attention as the other two. Numerous underdeveloped countries point to a preponderance of university graduates in the arts and

literature fields and to a corresponding deficit of technical and scientific graduates. This may be an outgrowth of studying in a foreign language. By the time the student has proceeded through elementary and secondary school and is eligible for study at the university, his academic preparation will be very strongly biased toward arts and literature because of the heavy concentration in those fields in his preparatory work. In some countries a child learns his local dialect in the home and may take his first 2 or 3 years of schooling in that language. He may then complete his elementary schooling in the national language and begin using a foreign language on the secondary level. In addition, the university-bound student may be required to study at least one other modern or classical foreign language at the secondary level. In some countries, more than half of the last 4 years of the secondary school curriculum is devoted to the study of language and literature. Although this is an extreme example, it demonstrates how language and literature requirements may force out of the curriculum at least some of the preparatory courses desirable for further study in the technical and scientific fields. The development of a methodology for teaching foreign languages specifically as they relate to scientific and technical fields might overcome some of the current imbalance of specialization in literature and the humanities.

Study in a foreign language is a current feature of many foreign assistance programs. In countries where training in certain specialized fields is not available, the practice has been to send students abroad for training. Studying in a foreign country places a premium on the student's foreign language capability which *may or may not* be related to his capability in the field he intends to study. It would be helpful if cross-cultural studies could be made to determine the extent to which language aptitude is related to other aptitudes. It may be that the most capable language student is not the most capable engineering student.

None of the alternatives appears to be so obviously better than all of the others that the planner's choice can be automatic. Further detailed study of the relevance, if any, of language aptitude to other, selected aptitudes, and studies which illustrate the potential of new methods of language instruction for increasing efficiency in the teaching of foreign and the new national languages would seem to be two high-priority needs.

Compulsory Education

Like literacy, compulsory education is an internationally aspired-to objective of economic development. Also, like literacy, it would appear to become a consumer good rather than an investment, after a

certain point. In general, similar problems exist and the same criteria seem to apply to the implementation of compulsory education as to the universalization of literacy. Some countries could virtually exhaust their current resources in programs designed to implement compulsory education. It is still open to question whether such programs would represent an optimum utilization of resources to promote economic development. The problems involved in attempting to extend a formal educational system to remote areas of a country are even more complex than those encountered in extending universal education to urban and heavily populated rural areas. Available evidence would seem to support a program which concentrated on extension work and community development projects in the remote areas rather than on investing excessive amounts in trying to extend and enforce compulsory education in such areas.

Specialized Training

Both vocational and professional training have significant roles to play in promoting economic development, but there is often a tendency to overrate their contribution. This is perhaps due to an apparent greater ability to predict future utilization of the end product. As discussed earlier, this predictability is not as real as it would appear in all cases. A person who has received specialized training has been trained to do a specific job, or to perform a specific function in the economy. He has not necessarily been given a basis on which to develop other skills. He is therefore considered "trained" rather than "trainable."

The demand for trained manpower is proportionately greater in a labor-intensive economy than in an economy that is capital intensive. In labor-intensive industries, particularly in handicraft industries, there is greater need for craftsmen; i.e., persons capable of creating a product. As an industry utilizes more and more capital, the mode of production begins to shift. There is an increasing demand for persons who have mastered only one of the skills necessary for producing a product, until, finally, in the advanced stages of automation, the task of labor is changed completely to that of operating a machine. The machine produces the product or performs the skilled operation which was formerly a function of manpower. Thus, as progress is made toward applying more capital to the productive process, one can expect an increase in the demand for trainable manpower—for persons who have a more general educational background and who are familiar with broad fields of knowledge rather than those trained in specialized tasks. This trend is not so marked in the professions, where there is a tendency to become more and more specialized as new capital and technology become available.

Vocational training is proposed by many as a means of developing the skills that will one day be essential for the development of industrial enterprises in the underdeveloped countries. However, a great deal more research should be done before such training is concentrated in the public school system. Specific problem areas which seem to require further research include the following:

1. The question of the grade level at which such training should be offered is of importance, particularly in view of the high dropout rates in many underdeveloped countries. If it is considered desirable to teach basic home economics to as many young girls as possible, but if most of the girls drop out of school after 2 years, some way should be found of including the home economics course in the curriculum of the first 2 years of schooling.
2. Attracting the student to vocational studies is a continuing problem in underdeveloped countries. There is an expectation in virtually every culture that education will prepare one to work more with the mind and less with the hands; this expectation seems to be greatly intensified in those underdeveloped countries where the social reward for manual labor is virtually nil. In Asia, for example, the traditional image of a farmer as an illiterate up to his knees in cow dung is not one to inspire young people to invest their time in studying to become better farmers; if educational opportunity exists, the drive is to utilize it for the type of education which makes manual labor unnecessary. There is a tendency for technical secondary school graduates to conceive of themselves not as skilled labor, but as professionals whose qualifications are only somewhat less than engineers.
3. The propriety and feasibility of undertaking all types of vocational training programs as a part of a system of public education should be investigated. It has been noted in some countries that there are other, more appropriate channels (according to local practice) which should be considered. For example, there is considerable difficulty attracting Malayan Chinese to technical secondary schools for training in the building trades. The existing system is such that access to this field is through a form of apprenticeship; i.e., working up through the hierarchy of the industry. Technical school graduates must also work up through the same channels, a fact which lowers the apparent utility value of such training in the eyes of the potential student. Professor Harbison advocates shifting "as much responsibility as possible for *training* to the major employing institutions."[12] There are

[12] Harbison, op. cit., p. 19

valid arguments opposed to such a procedure, but they are not sufficiently strong to eliminate the proposal from consideration.

4. Vaizey identifies the major problem in technical education as that of providing technical teachers: "They have to be recruited from among those who are already technically qualified and mature, and are, therefore, likely to expect higher rates of pay than other teachers, even though their academic qualifications are lower." [18] It should be added that the small number of graduates of technical schools going into the labor force will be further diminished by the number who remain in teaching. Actually, the teaching of technical subjects might appeal to graduates more than going into the labor market because of the higher prestige attached to teaching. If Harbison's suggestion for conducting training in major employing institutions were followed, it might result in a more efficient utilization of trained manpower.

Professional training, the other major aspect of specialized training, presents another complex of problems, although it shares with vocational training the problem of teacher supply. As noted earlier, the *nature* of vocational training changes with technological progress and automation. Technological progress has increased the body of available knowledge in the professions so that there is a marked tendency to specialize, but automation is only beginning to change the *nature* of professional tasks. The principal problems in providing adequate professional training can be grouped under the headings of standards, requirements, objectives, and cost.

Standards are an important, indispensable characteristic of a profession. In fact, it might be argued that self-enforced professional standards are among the features which distinguish a profession from a vocation. However, it can also be argued that some professional standards which appear proper in their original setting are superfluous in another culture. The fact that professional standards in country A demand that a man have *xyz* qualifications in order to hold a given position should not mean, necessarily, that *xyz* qualifications are essential for a man holding a similar position in country B. However, professional standards of the more developed countries are often generally aspired to by less-developed countries without considering too carefully their applicability to local conditions.

Requirements are generally considered as the basis for standards. However, there are standards which seem to represent more of a professional affectation in certain affluent societies; this is particularly true when such standards are viewed in another social context. For this reason, requirements are discussed separately from standards.

[18] John Vaizey. "Some of the Main Issues That Must Be Faced in the Strategy of Educational Supply." Unpublished paper presented at the OECD Policy Conference on Economic Growth and Investment in Education held in Washington, D.C., Oct. 16–20, 1961. p. 13.

Because of the high cost of training, professional requirements in an overall educational plan should be based upon minimum needs in the initial stages. There is an implied assumption in some of the manpower studies already made that expatriates now serving in less-developed countries should be replaced by nationals having equivalent professional qualifications. This assumes that the minimum qualifications for the position are the qualifications of the person holding the position. Projections of manpower needs based on such an assumption may result in an overestimation of the need for professional training facilities.

The objectives of professional training would seem to be easily determined. However, status problems arise in fulfilling planned targets in the intermediate professions. It is difficult to attract students to the less lucrative professions and to positions requiring less than full professional preparation, even though greater numbers of trainees are required in these fields. For example, one architect or aeronautical engineer can provide work for many draftsmen, but there are often too many candidates for engineering training and too few applicants for training as draftsmen.

The cost of professional training, particularly in some highly specialized fields, is usually considerably higher than vocational training. The period of training is longer and the physical plant required is more elaborate and often it serves a smaller number of students. The training of the instructional staff is more expensive in terms of time and money; teachers' salaries are likely to be higher; and, as in the case of the physical plant, fewer students benefit from their use. In some cases, it is less expensive for an underdeveloped country to send students abroad for specialized professional training than it would be to provide local facilities for such training. Regional training centers have been proposed as one way of meeting this problem, but nationalistic rivalries have thus far made the regional approach impractical.

In conclusion, the objectives of professional training must be related to requirements, and local professional standards should be based upon the specific objectives and requirements of the local society rather than upon the professional standards of alien and more affluent cultures. The high cost of professional training demands that professional manpower needs be very carefully assessed.

Teacher Training

The training of teachers is one aspect of planned educational development which directly affects and is affected by all developments in education. For this reason, more basic information is required in this field than in planning any other aspect of educational development.

Once the basic information on all aspects of planned educational expansion has been collected, it should be possible to estimate the total teaching requirements.

As countries contemplate the expansion of educational programs, the problem of supplying teachers is of crucial importance. Perhaps a more accurate wording would be "the problem of providing teaching," because such a phrase allows for technological and methodological development which can increase the supply of *teaching* without increasing the number of *teachers*. It also allows for developments which would make the present supply of teaching available to a larger number of students.

Implied in any system of education is a system of instruction which may be conducted through various media, such as books, filmstrips, movies, television, radio, and teaching machines. However, most systems at present rely principally upon the individual teacher to instruct, making use of such media as are available. In very general terms, the educational goals of a system have tended to be a subjective compromise between quantity and quality. This compromise often appears to have been based upon an implicit assumption that an increase in one would result in a decrease of the other. The assumed relationship is relative, however, depending to a great extent upon the technology for instruction.

The term "technology for instruction" refers both to the applications of pedagogical science and to technology not specifically related to formal instruction, but which affects the field of education, such as improved methods of transportation and communication, improved construction methods, etc.

Teaching requirements can be translated into the estimated requirement for teachers by selecting the most promising of a series of possible "modes of instruction." The modes of instruction would each represent a specific combination of resources; collectively, the series of modes would make possible a wide variety of qualitative and quantitative end results with varying cost and efficiency factors. One mode may make far more efficient use of human resources through heavy capital investment than another which stresses a substantial investment of human resources and a judicious use of physical capital. Real or potential human resource capital is usually far more plentiful than physical capital (and the means of producing it) in the less-developed countries. Therefore, the most appropriate mode of instruction is likely to rely upon manpower a great deal more than physical capital—particularly the types of physical capital which can only be obtained through substantial expenditures of foreign exchange.

Another factor which will influence the choice of a mode is the rate of planned expansion of the educational system. Although any of a number of modes might achieve comparable qualitative and quantita-

tive results over a 20-year period, some may produce a greater rate of growth in the early stages than others. In such cases, the mode which produces the most rapid rate of growth in its initial stages may be selected, with the intention of shifting to another mode once the rate of growth achieved becomes less than that possible using an alternate mode, or when a quantitative goal has been achieved and the need is felt to shift emphasis to qualitative goals. An example of a mode which can make possible a rapid initial rate of growth is an emergency teacher training program by correspondence, which makes it possible to increase the supply of teachers, though not without sacrificing quality. Such an emergency mode of instruction might be followed by a program for the gradual upgrading of the teachers trained through the correspondence program. This would be a transitional mode of instruction which should tend to increase the quality of instruction by improving the qualifications of the teachers.

Teacher training needs can best be assessed only after a mode of instruction has been adopted. Attempts to plan a system of teacher training without reference to the mode of instruction can result in considerable wastage. Because the mode of instruction determines the amount and type of physical capital to be employed in the teaching process (basic school architecture, classroom equipment, textbooks, teaching aids, etc.), it also affects the training of the teacher, since he will be most effective when specifically trained to make the best use of the facilities designated by the mode. The mode also determines the number of teachers that should be trained because of the physical/human capital ratios implied. Other factors will influence the estimates of the number of teachers because the mode is formulated in constant terms which seldom exist in any given country. For example, the mode may call for a student-teacher ratio of 60, but there may be areas of the country where it is not possible to collect 60 students for a single class. This, and similar factors, must be allowed for in estimating the number of teachers required.

No amount of emphasis on modes of instruction can serve to diminish the crucial importance of teacher training programs for maintaining a system of education as well as for contributing to its expansion and renovation. Because it must be able to provide for the training of human resources to implement a previously determined, overall instructional requirement of the educational plan, the planning of teacher training should be a later-stage, rather than an early-stage operation.

Education of Women

Related to the problem of providing more teaching for the expansion of an educational system is the subject of the education of women.

Aside from the moral and social issues of equality of opportunity for women (which have not yet gained universal acceptance), there are indications that many countries could profit substantially through the education of a greater number of women. The influence of the woman as a teacher, both within and outside the formal educational system, is significant throughout the world, although it appears to be stronger in some cultures than in others. The education of more women should qualitatively influence the teaching role of the woman outside the educational system and should also create a larger supply of potential teachers for the system.

The education of women, particularly in countries where there is little opportunity for them to pursue a profession, would appear to be primarily a form of consumption, rather than investment, and may be minimized for that reason. However, the extent to which women are instrumental in the formation and maintaining of social attitudes should enhance their value as potential agents of change. If the education of women can influence their nonformal educational role in the direction of promoting necessary changes in social attitudes, it becomes a form of investment. For example, changes in attitudes might be brought about through the education of women by eroding the concept that education gives the individual a status which places him above manual labor. The presence in the home of an educated woman who performs manual tasks connected with the household is a living example to the youngster of how education can be used to improve one's skills for performing tasks, not for avoiding them. The influence that the mother exerts over the child during the years before he reaches school can be equally, perhaps even more, significant than the influence of the teacher on the student after he is in school.

Educated women are also a source of teacher supply. In most countries of the world, there are relatively fewer career opportunities open to women than to men. Furthermore, as Vaizey points out, the wages and salaries of women are usually lower than for men doing similar work. These two factors combine to increase the economic desirability of training women as teachers because their opportunities for alternative employment are fewer and their pay scales are not likely to be as high.[14]

It should also be noted that there exists in many countries a latent supply of teachers consisting of married women who were formerly schoolteachers and who might be brought back into the profession. Although many such persons might require some refresher training, the cost of such training, plus that of maintaining them in the profession, should be substantially less than for new teachers.

Although the educated woman may be a valuable agent for inducing change in an underdeveloped country, it should be recognized that,

[14] Ibid., p. 15.

in some countries, a great deal of social change must take place before the education of women can take place on a significant scale. More research is needed before sufficient, conclusive evidence can be accumulated to convince planners in such countries of the economic benefits to be derived from the education of women. However, some early progress might be made by encouraging the extension of more educational opportunities to women in geographic areas where the population density is so low that there is an underutilization of educational facilities if only male students are permitted to attend school. The issue of providing education for women may be a sensitive one in some cultures, but its importance in promoting economic development should not be ignored for that reason alone.

The Role of Private Education

Private education is considered here as a separate category primarily because it is assumed that, by virtue of its being private, there is relatively less government control over its operations than over those of public education. Actually, the term "private" education is less meaningful than the term "private-type" education. In this context, the chief distinction is that in the private-type educational institution, the student is expected to absorb most of the cost of his education, whereas public funds are used to meet most of the cost in public institutions.

Educational planning is complicated by the fact that national statistical reports often do not include information from the private institutions, a fact which can result in a distorted picture of educational needs and in unnecessary expenditures for educational resources which already exist. This is particularly true in most Latin American countries and the Philippines where, on the secondary level, private educational facilities are more abundant than public. The current practice of comparing expenditures for education in various countries often presents a distorted picture because of the wide variation in the proportion of total educational expenditure which comes from private sources.

Vaizey has offered an interesting suggestion for augmenting the role of private, or private-type, education in underdeveloped countries.

> Social surveys show that it is predominantly the well-to-do who avail themselves of public education at the higher levels. As they are well able to afford to pay for their children's education, it is in a sense paradoxical that they should be provided with it free, in fact at the expense of the less-favoured members of the community. In this instance, the provision of free public education represents a transfer of income from the poor to the well-to-do.[15]

[15] Ibid., p. 14–15.

Vaizey continues by suggesting that a system of scholarships be devised to make it possible for capable children of poor families to have the option of attending either private or public schools. One might develop this idea even further in some countries where private educational facilities are relatively abundant. Public secondary and higher education could be conducted on a private-type basis; i.e., by charging tuition and fees which would meet most of the cost of educating the student. A government scholarship program would enable the qualified children of poor families to attend and the children of the well-to-do would have to meet their own expenses. This would have the effect of integrating public and private education on the secondary and higher education levels, and should reduce the cost to the general public of educating the children of the wealthy.

Professor Harbison's suggestion that vocational training be undertaken as an activity of the employing institution would also constitute the use of private facilities for education, at least in those institutions not controlled by instrumentalities of governments. Both Harbison's and Vaizey's proposals indicate the desirability of including private education in the overall planning process. The extent to which private education can actually be integrated with public education will depend upon public policy in the particular country. The presence of private educational facilities within an underdeveloped country is an advantage which can be put to good use without doing undue harm to either the public or the private institutions.

Part-Time and Correspondence Education

Part-time and correspondence education are two modes of instruction which are particularly well suited to the education and training of adults, primarily because of the lower opportunity costs involved in making use of either mode as opposed to full-time education. Before discussing this advantage, a few remarks are necessary concerning opportunity costs themselves.

Opportunity costs are that portion of total investment in education which represents the amount of income sacrificed by the student in choosing to attend school rather than to be gainfully employed. The fact that opportunity costs exist is seldom challenged; the present methods for calculating such costs may be open to question. The chief difficulty in assessing opportunity costs is in determining the extent to which the amount of income that the individual might earn is dependent upon the number of "employable" persons in school. In other words, the presence of a large number of employable individuals in educational institutions may be necessary in order to maintain the current wage level in the economy. The marginal approach to

calculating opportunity cost may be valid for the individual, but it is of little use in the process of planning educational expansion.

The calculation of opportunity costs in more advanced economies is likely to produce exaggerated results; in underdeveloped countries the results may be even less dependable. In underdeveloped countries that have high apparent rates of underemployment (disguised unemployment), it is probable that, if an additional 6 to 10 percent of the population were compelled to attend school, the wage level in the economy as a whole would rise. Using the marginal approach, this would result in a revising of opportunity cost figures upward because, theoretically, every individual making the choice under the new wage conditions would have the option of earning more money by remaining in the labor market. However, the opportunity cost of a specific mode of instruction which keeps an additional increment of the population in school rather than in the labor market cannot be calculated on the basis of the new market conditions because the maintenance of the new wage levels depends upon this increment remaining in school. Nor can it be accurately calculated over a period of time on the basis of the original wage level, because there are other factors which influence the level of wages, and it is virtually impossible to determine what the level would be if factors a, b, x, y, and z did not obtain. Thus, the dilemma exists—one must calculate the marginal opportunity cost on the basis of a given mode of instruction and the effect it has on the labor market; but the opportunity cost of the mode of instruction itself is more nearly represented by what the labor market situation would be if the mode were to be abandoned in favor of another mode which would have a quantitative effect on the labor force.

The fact that meaningful opportunity costs are virtually impossible to calculate in market economic terms for underdeveloped countries, where the marginal productivity of labor may approach zero and large sectors of the economy remain unmoneyed, does not invalidate the concept. The fact that a cost does exist, in terms of real or potential productive man-hours, must be taken into consideration by the planner, even though he cannot determine it accurately in monetary terms. Thus, the formulation of a mode of instruction should take into account the possible effect on both the size of the labor force and on the number of hours it is engaged in productive activity.

Part-time and correspondence education are two modes of instruction which can be used concurrently with other modes. In countries anticipating accelerated economic growth, either of these two modes seems well suited to retraining and upgrading the skilled labor force. If some underdeveloped countries find it possible to develop their economies at a forced pace, it will be necessary to retrain many members of their labor force in order to utilize new technology. Indeed,

it is not fantastic to speculate that, if technological advance continues at its present pace in the world, members of the skilled labor force in developing countries may have to be trained twice, even three times within their productive lifetimes. It is in the interest of the economy that this retraining be accomplished with as little adverse effect on the labor market as possible. For this reason, the existence of opportunity costs must be recognized even if such costs can seldom be accurately expressed in monetary terms. Training which allows the individual to continue his productive employment while receiving additional training should tend to minimize opportunity cost; part-time and correspondence training appear to meet this requirement.

There is one additional social benefit which may result from part-time education. The combination of productive employment and part-time education may help to erase the social stigma attached to manual labor for the educated.

Curriculum Development

The development of a curriculum which meets the specific needs of a country's stage of development requires far more than the pouring of old wine into new bottles. Many of the less-developed countries are doing little more than perpetuating the system of education inherited from the former colonial power. Laws governing the licensing of physicians, lawyers, dentists, plumbers, carpenters, teachers, engineers, etc., are little changed from colonial times. Consequently, the curriculum remains much the same in order to qualify graduates to practice their professions under the law. In addition, custom, and inertia which is nurtured and supported by custom, present similar obstacles to change.

As discussed in the section on specialized training, most of the less-developed countries cannot expect to meet professional standards set by more affluent societies. Although a country like the United States finds that it can afford medical care which costs more than $100 per capita annually, there is no reason why medical training offered in other countries should met U.S. standards, particularly if one is considering countries with annual per capita incomes of less than $50. Such countries must develop basic medical care which costs no more than $4 or $5 per capita per annum if they are not to spend a larger percentage of their national per capita income on medical care than the United States.

The bulk of curriculum research being conducted in the United States and many other Western countries does not address itself to the pressing problems in most of the less-developed nations. The United States may be concerned with keeping all of its school-age population in school through the 12th year, whereas the underde-

veloped countries may be struggling to keep one-third of their population of school age in school through the 4th year. Curriculum-wise, two completely different problems are presented by these examples. In the United States, educators have 12 years to expose children to the knowledge that is considered desirable or essential to prepare them for their role in society. Home economics, health, hygiene, basic sanitation, manual arts, basic science and arithmetic can be presented to the student when he has reached a reasonably mature age. In countries where fewer than one-third of the students complete the fourth year of school, some aspects of home economics, health, hygiene, basic sanitation, etc., should ideally be included in the curriculum of the first 4 years because there may be few if any other opportunities to expose this segment of the population to such ideas. Furthermore, curriculums in the United States tend to reinforce the social values of the American system, and to the extent that change is introduced, it is introduced into a society which is relatively receptive to change. In the less-developed countries, well-conceived curriculums could eliminate certain "roadblock" institutions in traditional, change-resistant societies, but there is little research in progress in the more advanced countries which will greatly assist the less-developed nations to accomplish this.

Stated briefly, and emphasizing economic criteria, the less-developed nations must, in the short run, concentrate more on the essential and less on the ideal. In order to realize the rapid rates of growth envisaged by the econmic planners in such countries, maximum benefit must be derived from the educational system. To achieve this, the consumption aspects of education should be minimized just as other forms of consumption are curtailed. Curriculums should be scientifically formulated to meet the minimum basic needs of a developing society and must be suited to the mode of instruction adopted. Before progress can be made on a significant scale, planners must have more information on the degree and nature of economic and social change which can be induced through the content of education. Economists and comparative educators should collaborate in producing studies which attempt to correlate the process of economic growth with specific courses and fields of study. Until this is done, the process of curriculum development in the less-developed countries is likely to be more speculative than scientific.

Team Teaching and Community Development

In most underdeveloped countries, the sector of the economy employing the largest number of people is the most underdeveloped in terms of per capita income and productivity. Although the bulk of the population is engaged in agriculture in the rural areas, personal

income and per capita capital investment are usually much higher in metropolitan centers. Prospects for achieving a sustained, accelerated rate of economic growth will not be favorable until a sizable segment of the roughly 75 percent of the population residing in nonmetropolitan areas is committed to increasing its productivity and improving its standard of living.

The trained manpower resources of the nations, such as doctors, teachers, dentists, engineers, and primary and secondary school graduates, also tend to gravitate to the cities and thus deprive the traditional rural communities of the human resources and potential leadership which are needed to initiate and sustain development. Among the factors which entice the graduate to forsake his rural heritage are the urban attractions of higher living standards and the real or apparent job opportunities in more prestigious occupations. In some countries, the pressures exerted by the traditional society may be too great for the relatively small number of school graduates to withstand successfully, and traditional respect for the older members of the community may restrain the younger generation from asserting itself.

The desire of the educated youth to move to metropolitan centers may result primarily from the fact that his education has better prepared him to live in such an environment. In educational systems where the texts and other basic reading materials are, at best, adaptations of materials prepared for use in alien systems, the examples used for illustration and the content and setting of the literature usually relate the substance to an unfamiliar environment. The gap between the realities of rural life and the environment in which such study has prepared the student to live may be so wide that he cannot conceive of ways of bridging it. Therefore, since his education has provided him with the qualifications to seek white collar employment but has done little to train and motivate him to apply his newly found skills to improve his rural environment, he will probably move to the city.

This vicious cycle must be broken. Productivity and, to a certain extent, the standard of living, must be improved in the rural agricultural sector of the economy. However, attempts to use education to introduce new technology and to train manpower to achieve this end are often thwarted by the migration of too many manpower units to the cities. This exodus can be partially attributed to the unsatisfactory living conditions in rural areas. One task which the planner must face squarely is that of breaking this cycle so that the trained person who is essential to increasing productivity and improving living conditions, will choose to remain in the rural community. This is a significant part of community development. A number of countries have already initiated community development programs and often considerable progress has been made.

Although, for reasons of brevity, the pertinent questions of compulsory education, literacy, teacher training, and curriculum development are not discussed again in detail, the previous sections dealing with these topics apply in various ways to the following proposed plan of action.

In general terms, prospects for sustained community development should be enhanced:

1. If a significant segment of the rural population can be imbued with the desire to improve their position in life;
2. If the migration of trained manpower from rural to urban areas can be substantially reduced;
3. If living conditions in rural areas are improved; and
4. If marked increases in productivity are possible with the resources available to the community.

It should be added that at least the first three of the above conditions are goals of economic development; they are also preconditions for achieving it in the sense that the society must be committed to them for motivational purposes. Investment has been omitted because it can be more easily forced through various instrumentalities of government.

Community development, team teaching, and a "domestic peace corps" are the major components of the proposed mode of instruction for bringing about the conditions stated above. This particular mode is specifically tailored to the areas and regions within the underdeveloped countries which have not been reached by the formal educational system. It is based on the assumption that the individual country cannot, under existing conditions, provide clerical and other white collar jobs for the graduates of primary and secondary schools on the scale that the graduates expect—in other words, that there is a growing unemployed intelligentsia.

In countries where this phenomenon is a problem, the chief qualification that diploma holders from primary and secondary schools have is literacy. At any rate, without this qualification, they would not consider themselves eligible for clerical positions. As long as there are not enough job openings for the number of graduates emerging from the schools, there is the possibility that significant expansion of public education facilities in the country will produce an increasing number of dissatisfied graduates who may turn to radical politics as a possible solution to their problems. Therefore, a dilemma arises—education is proposed as the means for inducing change and for promoting economic development; at the same time, an expansion of education may contribute to political instability by creating dissatisfied, unemployed graduates who are not content to perform the tasks most essential to the development of their country.

Community development programs which rely upon teams of teachers who introduce community-oriented technology through oral teaching could be of great value. This approach would have the advantage of providing a means for introducing new technology into the rural communities and should enable them to increase productivity and the local standard of living without giving individuals the "qualifications" which lure them away to imagined clerical jobs in the cities and which eventually may lead them down the frustration-lined path to radical politics.

Some might argue that this would be depriving the people of their "right" to education; it is debatable whether this right is a tangible benefit under the circumstances described above. Nor does the proposal preclude literacy training from being offered at whatever time it will in fact be an advantage to the individual.

The successful execution of the proposed program would depend upon the development of community-oriented technology. A tremendous research and training operation would be needed to initiate such a program since it is of vital importance that community development be achieved, at least in the early stages, using only locally available material resources. For example, modern technology could be used to discover the best means of constructing housing with local materials, or architects could perfect designs which provide the maximum protection from the elements and pests, but still retain adequate ventilation and cooling. As this new technology is developed and refined, training centers should be established to train a "domestic peace corps" to apply, and to teach the applications of this technology. An ideal teaching team might consist of a home economist, a sanitation specialist, an agricultural technician, a medical technician, one technician each specializing in hydraulics and construction, and possibly an economist. Other specialists could be added where the availability of unique resources or other local needs demanded.

Once trained, the teams would demonstrate to the inhabitants of remote and undeveloped areas that their standard of living could be substantially improved simply by making more efficient use of resources already at hand. All teaching would be through oral presentations and practical demonstrations, with substantial emphasis on training local counterparts to assume the role of local specialist in his field after the team had departed. If possible, it would be advisable to recruit some of the original technicians from the target areas in order to minimize the chances of failure because of local hostility toward strangers.

Community development programs of this sort could be initiated at a cost not much greater than that for training teachers to search out illiterates in the bush, or for extending compulsory education to remote areas. Furthermore, this approach would tend to decrease

the flow of semieducated manpower to the cities in search of nonexistent, high-level positions to which they suppose they are entitled because of their education. Inhabitants of the remote, backward regions, where the written word is seldom seen or needed, should be able to improve their lot far more through the efforts of community development teams than by learning to read and write a few simple words which will soon be forgotten as long as followup reading materials are not easily available.

As communities develop better means of using their own resources and are able to improve their standard of living, a spark of economic motivation may be struck. If the improvement of skills precedes the teaching of literacy, there may be an awakening to the benefits that learning may confer. As a result, the concept of education as a means of improving one's ability to produce, rather than as a means of avoiding work, may gain increased acceptance. If this can be accomplished, the community will create its own demand for education on the local level *to meet local needs.* At this stage, literacy and formal education could be introduced. Some of the graduates might still migrate to the cities, but there would seem to be a good chance that many would remain in the villages where the demand for their skills is greatest.

This specific proposal is limited in its application and must be considered only as a *part* of a total program. It is a road which must be conceived as leading to further development and to other types of projects, not as an end in itself. It may be strongly opposed on grounds that it restricts freedom. Such a criticism presupposes that freedom already exists to be restricted. In regions where this proposal is applicable, this method of education should offer the individual a far greater opportunity to make a better life for himself than more formal methods. The chief reason for stating this proposal, however, is to illustrate the need for planning which is not confined to areas limited by value concepts, many of which are quite recent in origin and whose validity remains to be established. There may be no substitute for the pragmatic approach if a better life is to be realized for most of the people of the less developed countries.

SUMMARY

The "backward" economic state in which more than one-half of the world's population now lives is largely attributable to the failure of the people, individually and collectively, to develop the concepts, institutions, and motivations essential for the development of economically viable states in the mid-20th century. The political leadership in virtually every underdeveloped country is publicly committed

to developing internal capabilities in the shortest possible time. For more than a decade, the United States has expressed its willingness to support the efforts of such countries to develop their economies.

In order for the less-developed nations to achieve the rate of growth necessary to compress 100 to 200 years of economic development into less than 50 years, social development must proceed apace of, even in advance of, physical science technological development. Currently, there is a strong trend toward emphasizing the role of education in the developmental process. This trend is supported by a belief that sound educational planning can, in fact, induce economic growth. However, the available body of theory with which the planner must work in attempting to promote economic development through educational planning consists of many questions and few answers. This fact should inject a tone of humility and caution into efforts intended to assist the underdeveloped countries. On the other hand, to advocate caution is not to propose inaction.

The chief pitfall to avoid at this point is to appear to promise more than one can expect to deliver. If a limited approach is taken on the operational level and is accompanied by a major research effort, the latter should produce a body of theory which will make possible a more concerted and extensive attack on the problem.

The situation at present is one in which there is a heavy reliance on the "expert." It can already be observed that the first efforts of a few experts have been used with far greater faith than would seem justified by their substance. Although such studies or surveys may be replete with qualifying statements designed to alert the reader to the fact that they have not been based on reliable data, they also contain projections and targets. Thus far, there seems to have been a tendency to ignore the cautionary remarks and consider the targets and projections as gospel. Internal inconsistencies, some of which are already apparent, may result in the failure of an economic plan based on such studies, and the final outcome may be the discreditation of the bold expert, as well as the country he represents. Even more important, the concept of promoting economic development through education may lose political support.

A well-conceived program will guard against such an eventuality through comprehensive research activities which will make possible a considered evaluation of initial efforts. It is to be expected that miscalculations will occur in the early stages of such a new venture. The results of a comprehensive research program should enable scholars to offer reasonable explanations for shortcomings of initial programs to prevent political disenchantment with the basic concept.

Finally, the author is of the opinion that the nature of the problem of underdevelopment may make it increasingly difficult for governmental or intergovernmental organizations to be perfectly candid in

their approach. There seems to be a somewhat vague code of international morality which tends to avoid recognizing that, *using economic criteria*, a country can be underdeveloped culturally as well as physically. It is also not considered appropriate for public policy to infer that there may be a causal relationship between certain unique cultural traits and problems of economic underdevelopment. It is extremely difficult for an intergovernmental agency or a national government to formulate public policy and allocate funds for projects which attempt to induce change in the hallowed area of the national culture.

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