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FOREIGN STUDY AND MODERNIZATION: THE TRANSFER OF TECHNOLOGY THROUGH EDUCATION

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Foreign study and modernization: the transfer of technology through education [1]

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The challenges posed by new nations in process or pursuit of modernization have turned the attention of aid planners and theorists to the strategic role played by education in developing human resources. Foreign study is one means of transferring technology and knowledge. Systematic data are lacking on its actual consequences in relation to other assistance strategies or to the societal context of the returned student. Findings from an evaluation study of recipients of United States technical training from twenty-nine countries are used to shed light on the transfer process. Underlying institutional arrangements emerge as significant influences upon the outcomes of this mode of inducing technological change.

Education and development: the human resources problem

The comparative analysis of the functions of education and formal training for the modernization process in less developed countries has been a recent development. In the period of Europe's post-war reconstruction and the renaissance of its nations' economies, the comparative social scientist worked with a model of the development process in which inevitably the economy occupied the central place. The economic model which guided development planning and the formulation of aid programmes identified capital formation and investment as the principal mechanisms by which development goals could be achieved. And it was difficult to argue with the success with which the application of this model was crowned: the supplying of capital through the Marshall Plan quite rapidly brought about massive changes in the structure and pace of European economic life. This theoretical scheme, as many pointed out, however, did not incorporate adequately a host of social factors, notably the extent to which Europe's rebirth hinged upon its long history of building up a wide range

1. This grew out of earlier work by the writer on the evaluation of a United States technical training programme administered by the Agency for International Development. Data reported here stem from that study; the responsibility for analysis and interpretation rests with the writer. The full study is reported in the writer's monograph, *The Transfer and Use of Development Skills*, and in four briefer regional reports published by the Office of International Training of AID.

of relevant skills and institutions among its population. 'Europe', it has been said, 'did not have to be invented; it only had to be remembered.' (Perkins, 1966, p. 609.)

But the rise of new nations in the Third World posed new types of developmental problems for which capital formation or investment schedules no longer seemed adequate, either in concept or practice, as the main mechanism for achieving the goals of rapid modernization being proclaimed (if not always pursued) by their leaders. Quite often, capital assistance could not be productively employed owing to deficiencies in certain aspects of the relevant social organization. A more complex model was needed which viewed development as a process of 'social mobilization' (Deutsch, 1961). The societal functions, both diffuse and specific, subserved by education (especially higher education and specialized training) attracted growing attention on the part of planners. Influential economic theorists showed a renewed interest in problems of investment in education and in the concept of 'human capital' (Schultz, 1961; Becker, 1964), stimulated in large part by the insistent challenges to conventional economic wisdom presented by underdeveloped nations. The crucial role of human resources in economic development became a common theme in the analysis of the plight of underdeveloped nations, one which transcended ideological differences. One has only to compare the following two excerpts, chosen from many of a similar character.

'A solution to the financial problems . . . is in itself clearly insufficient. . . . Without creating a broad base of necessary personnel and specialists, . . . without a skilled labour force, no country can achieve genuine independence. Plants and factories are built by people, technical improvements are made by people, machines are operated by workers and at the helm of production is a manager. All require education and training.' (Rimalov, n.d. (1961?), p. 58.)

'To develop the kinds of men and organizations which modern economic activity requires is . . . (a) major precondition for initiating take-off. No matter how much external aid in the form of foreign exhange may be available . . . there must be men on the spot in sufficient numbers to supply managerial, technical and mechanical skills. . . . (*Centre for International Studies*, MIT, 1960, p. 1122.)

This consensus in the formulations of Soviet and United States analysts of one precondition for development was not based on commonly-held theoretical principles. It arose in large part, it may be suggested, from the experience gained in grappling with the practical problems and requirements of aid programmes undertaken during the period of intense East-West competition for the support or favour of the Third World. The need to provide technical assistance to accompany other forms of development aid became increasingly apparent, and cast into sharper relief the human resources development problem. Education and training came to be seen as one proximate solution.

A number of theoretical and practical difficulties arise in assigning to

educational institutions the dynamic functions of helping to provide both the wherewithal and the thrust for the modernization of traditional societies. Sociological analysis usually attributes two primary functions (both shared with other institutions) to the educational institutions of a society: the integrative one of transmitting the cultural heritage through the socialization of the young, and the instrumental function of channelling its members into positions in the existing social structure (Eisenstadt, 1964). Increasingly, advanced industrial societies assign these functions to their formal educational systems, which characteristically respond rather slowly in meeting the altered requirements imposed upon them by the pace of technological or social change, or in adapting their structure at the urging of political leadership. Thus, education's contributions to the evolution of national societies, while in some senses fundamental, are primarily cumulative and slow-acting. To what extent, then, can education be employed as a tool for rapid social change and economic growth?

The attempt to answer this question underlies much recent work in educational planning and has produced a good deal of research and speculation on the links between education and development (Anderson, 1963; Anderson and Bowman, 1965; Coleman, 1965; Hoselitz, 1965; Platt, 1965). In much of this literature education is viewed in its instrumental guise; that is, its significance for the economic structure and its occupational requirements. In supplying itself with professionals, trained specialists and skilled workers, a nation is confronted with various 'make or buy' decisions. It can seek to create or expand an indigenous capacity for producing people with the needed skills and knowledge; it can import expatriate experts to set up or operate development projects (including those in the area of education); or it can send its citizens abroad for training or education.

All of these paths have well-recognized advantages and drawbacks (Anderson, 1964; Maddison, 1965). For example, building up local educational facilities, while perhaps preferable from a long-term perspective, is slow, costly and immediately raises a host of serious problems of priorities among educational levels or curricular emphases. With respect to higher education problems of selection arise and of controlling access to scarce openings which will serve as obvious bases for the formation or recruitment of new elites or cadres of experts (Coleman, 1965, Part III). Expatriates, being in short supply, are also very costly and tend to arouse negative feelings whatever the attitude they adopt towards their counterparts, their administrative superiors and those under their supervision. And study or training abroad, although more immediately available and open to larger numbers, is in practice often wasteful. A frequent criticism of training is that it is taken (or offered) in the 'wrong' subjects, or leads to over-qualification in relation to home country needs and conditions. This 'waste' of the foreign student's time and effort is variously related to another loss, one experienced by his country whenever he, now better trained or educated, prolongs his stay abroad or emigrates, thus

becoming a part of the 'brain drain', the invisible reverse flow of aid from the underdeveloped to the more affluent nations (Dedijer, 1961; Henderson, 1965; Perkins, 1966; Gollin, 1966).

In sum, as the part played by human resources in the development process and the facilitating or impeding effects of prevailing patterns of culture and social structure have emerged into sharper prominence, the instrumental value of education has become a topic of great practical import and also a significant issue for theories of developmental change. The paucity of systematic and comparative data on the consequences of various educational programmes and strategies has hampered the efforts of planners and theorists alike. This article represents a modest effort to supply some of the requisite data and to place them in sociological perspective.

Technical training as development assistance: concepts and programmes

The purposive transfer of technological skills and knowledge to less developed countries through training is a process which is here conceived of as operating at two levels. At the individual level, it involves the acquisition of a body of knowledge and techniques necessary for performing critical occupational roles. This can be seen primarily as a process of cognitive learning the successful outcome of which hinges mainly upon the character of the trainees and the quality of instruction. (Its ultimate relevance is a separate issue, to be discussed below.) A more complex aspect of the process at this level is the 'resocialization' of those undergoing training. The values and motives of the trainees must be articulated closely with the performance of their critical work roles. In the traditional sociological formulation, they must come to want to do what, from the society's stand-point, they have to do, if maximum social value is to be realized from their efforts. Where concepts of community are narrowly defined, and work discipline variably adhered to, new concepts must be 'caught' by those who will serve as change agents. Implicit in the idea of foreign study is the view that through an exposure to the values, norms and practices of economically advanced societies the trainees may come in time to change their perspectives on their society, their work roles or themselves in ways which will strengthen their later effectiveness as change agents. Thus, the process of 'enskilling people' (Lepawsky, 1961), from developing nations requires a dual focus: on substantive skills, and on the realm of attitudes and values which can shape future conduct. In parallel with this distinction, the thrust of training may be seen as having both a technical and a social aspect, combining with the transfer of specific occupational techniques or skills a grasp of the wider social system—especially its organizational component—within which such work roles are performed in the training country.

At the institutional level, this conception of the transfer process seeks to determine those elements specific to the occupational milieux of returned trainees which crucially affect the outcome of the process. Analysis must

include not only a careful initial definition of how the need for foreign training relates to the actual work settings in which it is to be employed, but also the identification of social forces impinging upon the work place which may affect the activities of the trainees. A reductionist view of the transfer process, one that identifies the individual trainee's ability, motivation and level of effort in his change-agent role as the principal determinants of effectiveness, is both inadequate in theory and misguided in practice. Theory and research on the diffusion of innovations and processes of technological change bear ample witness to the often vital role of social and cultural factors (Barnett, 1953; Mead, 1955; Rogers, 1962; Katz, 1963).

To sum up briefly, our argument so far is that in order to foster technological change through a purposive transfer process, one must simultaneously seek: (a) through education and training, to equip properly those who will perform key occupational roles; and (b) to identify and influence, wherever possible, the institutional arrangements which they will confront in ways favourable to the effective use of their training. Since the latter is more costly and difficult, involving complex and often delicate political issues which are apt to arise in many institution building aid programmes, this goal is less likely to be attempted or achieved than the technical training of individuals. Its importance as a prime requisite for effective transfer, as our findings will indicate, is not thereby diminished.

One of the principal strategies used by the aid-giving nations to meet the human resources needs of developing nations has been to offer opportunities within their own borders for the education and training of foreign nationals. They have done so in a number of ways; by expanding or earmarking educational facilities for them (e.g. Lumumba University in Moscow); by offering grants and fellowships; and more indirectly by establishing immigration policies, or encouraging university admissions policies which do not unduly restrict the entry of self-sponsored students. This last-noted mechanism can serve as a reminder that a large amount of educational 'assistance' has an unintended or unplanned character. Official policies and programmes must interact with patterns in the international flow of students which have deep historical roots (Gass and Lyons, 1962). In the United States of America for example, governmental sponsorship (full or partial) of foreign students and trainees in 1965 accounted for only 10 to 15 per cent of all those of foreign origin enrolled in institutions of higher education. And in that year alone, the same number of foreign students—about 90,000—were registered for training in the United States as has been sponsored for non-military training during the almost twenty year's history of United States programmes of technical assistance.

Participant training: antecedents and elements

The origin of United States government-sponsored training of foreign nationals can be traced to a small programme set up by the Institute of

Inter-American Affairs in 1942 (Thomson and Laves, 1963). War-connected projects in health and sanitation, agriculture, transportation and education were undertaken in several countries of Latin America. As part of these projects the first trainees, now termed 'participants', came to the United States for advanced or specialized training. A major expansion of technical training programmes which took place in the context of Marshall Plan assistance to the nations of Western Europe had industrial productivity as a primary focus. Teams of managers and workers came to the United States often for lengthy periods of instruction in modern industrial practices and to gain practical experience. Military training programmes, many of which had substantial carry-over effects for the civilian economy, were also initiated or expanded.

The next spur to the use of technical training and education as a mode of development assistance was the enunciation of Point Four in President Truman's Inaugural Speech in 1949, and as part of United States support for the programmes of international agencies. Aid policies for the steadily growing ranks of new nations in succeeding years were framed largely in the language of development assistance; education and training programmes bulked large in such pronouncements. Since 1955, with the founding of the International Co-operation Administration (now AID) about 5,000 to 6,000 participants from over eighty countries annually have taken some form of technical training in the U.S.A.; large numbers have also been trained in their own countries or in regional centres.

In their early years, such assistance programmes seem rarely to have been guided by any inclusive, carefully worked out schemes of manpower planning. Nor did the rhetoric used to describe them include reference to 'the development of human resources' as an underlying concept (Harbison and Myers, 1964). Most were undertaken because of their obvious short-run practical value as adjuncts to massive programmes of economic and military assistance. The political gains which might accrue to the U.S.A. from such exchanges seem to have been considered of minor and fluctuating importance. The actual employment of foreign study as a means of fostering technological change, in fact preceded the formulation of any consistent and over-arching rationale for doing so (Powelson, 1964).

In 1960 a co-ordinated series of evaluation and follow-up studies were begun by AID in order to ascertain the views of returned participants on the quality and, more important, the subsequent occupational relevance of their training. Interviews were held with them on their own soil, using a standard schedule translated into the most appropriate language. Answers were then coded in accordance with methods and procedures designed to ensure a maximum of comparability of findings among the co-operating countries. Data from surveys with former participants from twenty-nine countries (grouped here into four regions), completed at various points in time between 1960 and 1963, provide an empirical basis for the discussion which follows. (See Table 1.)

In this context, one can identify only some of the issues toward which

TABLE 1. Participants surveyed in evaluation study of United States technical training by country

Region[1] and country	Participants		
	Number interviewed	Weighted[2] number	Weighted per cent
Latin America			
Brazil	538	2 046	29
Bolivia	701	1 332	19
Chile	427	1 153	17
Peru	500	800	12
Ecuador	390	507	7
Costa Rica	388	504	7
Nicaragua	182	309	4
Jamaica	122	122	2
British Honduras	78	101	1
British Guiana	81	97	1
Surinam	73	80	1
Total	3 480	7 051	100
Far East			
Philippines	510	1 734	25
Thailand	512	1 690	24
Taiwan	619	1 609	23
South Korea	524	1 153	16
Viet-Nam	402	804	12
Total	2 567	6 990	100
Near East - South Asia			
India	1 449	1 594	21
Turkey	1 207	1 569	21
Pakistan	610	1 281	17
Iran	541	920	12
Greece	372	781	10
Jordan	254	508	7
Israel	369	443	6
Egypt	217	434	6
Total	5 019	7 530	100
North Africa			
Tunisia	454	636	35
Libya	224	560	31
Ethiopia	197	315	17
Morocco	147	191	11
Sudan	100	100	6
Total	1 122	1 802	100

1. These regions are defined in accordance with geographic categories used by the United States Government.
2. Sampling was done in most countries: the numbers interviewed in each were upweighted to correspond to the total of eligible participants at the time of the surveys (1960-63).

the survey was oriented and allude to a few detailed findings. Fuller documentation is available elsewhere (Gollin, 1966 b). The patterning of results to be discussed obtains in varying degrees across the four geographic regions, despite their many specific differences, lending greater generality to these findings.

Selected findings from the survey

Participants and their instructional programmes

Participants were predominantly men; two-thirds were of the age range 30 to 50 when selected, with a median age of 35. Upwards of three-quarters were government employees, occupying administrative positions at the middle and upper ranks of their governmental structure, or working as professionals or technicians. They were a well seasoned group, averaging eight years of experience in their most recent occupational specialty when selected. As a group they were and are clearly occupying positions of great strategic value in development planning, and in staffing or implementing projects in every field of activity. Their concentration in the government reflects its central role in development activities in most underdeveloped nations, as well as the selection emphases characteristic of a government-to-government programme.

This assistance programme can be distinguished from many other United States educational exchange programmes not only by the maturity of its participants but also by their high levels of prior educational attainment. More than half held university or first professional degrees; relatively few had taken no post-secondary training at all. Trainees from North African countries stand out as exceptions; they were much younger, lower in occupational status and much less well educated prior to being selected for training, reflecting in part the severe limitation of educational opportunities in those countries.

Programmes of training were determined in large part by trainees' status and achievements, and by the anticipated skill requirements of specific jobs or assistance projects for which training was deemed necessary. The training of most individuals was, ideally at least, 'hand-tailored' in advance, with its relevance certified as part of the process of programming. The largest numbers were trained in the fields of agriculture, education, industry and mining, health, transportation and public administration. The United States was the major locus for such training; together with Puerto Rico it received more than five out of six trainees.

The responsibility for instruction was delegated by AID, in a majority of cases, to other United States federal and state agencies (e.g. the Federal Aviation Agency, Bureau of the Census), and to several hundred universities and colleges, under contracts with AID or its predecessor agencies. Industrial firms and other private organizations also provided training. As a result of this decentralized approach, problems of co-ordination,

TABLE 2. Selected characteristics of recipients of United States technical training by region (in percentages)

Characteristic	Region[1]			
	Latin America (N = 7 051)[2]	Far East (N = 6 990)[2]	Near East South Asia (N = 7 530)[2]	North Africa (N = 1 802)[2]
Age				
Under 25	8	5	8	35
25-29	23	17	17	26
30-39	43	44	45	27
40 and over	26	34	30	12
Sex				
Men	88	86	92	96
Women	12	14	8	4
Occupational status				
Executives, administrators	6	7	11	7
Middle managers, officials	30	40	24	19
Professions: engineers, scientists, teachers	41	40	49	30
Sub-professions, technicians	11	9	8	14
Foremen, supervisors	4	2	3	4
Artisans, workers, others	8	2	5	26
Prior education				
University degree(s)	50	69	71	11
University attended	10	11	6	7
Special schooling, e.g., trades	23	13	13	29
No university or special schooling	17	7	10	53
Employer				
Government	73	70	83	81
Nationalized industry	1	14	1	—[3]
Private business, professions	18	12	8	12
Other (e.g., student, unions)	8	4	8	7

1. See Table 1 for list of countries in each region.
2. These are weighted numbers of participants, taking account of various sampling ratios in each country. Those who were NA on an item are excluded from the base for percentaging.
3. Less than 0.5 per cent.

timing, and of gaps between the expected and actual substance of training were predictable and in fact occurred. But the data show that such administrative problems had few results of any consequence. 'Social adjustment' is also a rather inconsequential problem area for these participants. Contrary to some of the findings of empirical research on foreign students in the United States in the preceding decade, who were younger, less deeply settled into careers or otherwise less socially integrated (Selltiz, 1963), there was little or no relationship between the few available measures of social adjustment in these surveys and participants' evaluations of the worth or the occupational outcomes of their training. This can be attributed in

large part to the maturity of the participants and the more structured, purposive character of their training sojourn.

Programmes are of three basic types: observation tours, usually lasting two to four months, taken by three-quarters of the trainees; on-the-job practical training, usually between four and twelve months, taken by two-fifths; and university studies, usually lasting nine to eighteen months (or longer) taken by one-half. A majority of programmes actually consisted of a combination of these types; the average length of stay abroad was nine months. Orientation, home visits and various cultural and social events were interwoven with the technical training, making for a diversified and, it is hoped a more pleasant American sojourn.

TABLE 3. Aspects of programmes taken by recipients of United States technical training, by region (in percentages)

Training programme	Region[1]			
	Latin America (N = 7 051)[2]	Far East (N = 6 990)[2]	Near East South Asia (N = 7 530)[2]	North Africa (N = 1 802)[2]
Field of training				
Agriculture	24	22	32	24
Education	9	19	12	23
Industry and mining	9	15	17	14
Public administration	12	14	10	18
Health and sanitation	15	13	8	8
Transport and communications	10	10	9	4
Labour	12	2	5	3
Community Development and welfare	2	2	3	1
Others	7	3	4	5
Duration of training				
Up to two months	11	10	4	10
Two to four months	28	8	15	17
Four to six months	15	6	11	10
Six to twelve months	21	35	38	31
Twelve months and more	25	41	32	32
Types of programme[3]				
Observation tours	63	73	73	66
University studies	46	52	54	59
On-the-job Training	43	44	46	47

1. See Table 1 for list of countries in each region.
2. These are weighted numbers of participants, taking account of various sampling ratios in each country. Those who were NA on an item were excluded from the base in percentaging.
3. A majority of participants' training combined more than one type of programme.

Only brief mention need be made here of several findings bearing on the perceived quality and effectiveness of the instructional programmes. First, language facility, in this case English, is an obvious precondition for

effective cognitive transfer, and this presented a problem of one kind or another for almost half of the participants. The only effective antidote would seem to be found in the selection process; the provision of special language tutoring appeared to have met with only limited success for these relatively short-term trainees. A second problem that has arisen in connexion with specialized or technical training taken by foreign nationals in advanced industrial countries is that such training is often too complex or is ill-suited to the conditions with which trainees must later contend, leaving them, as it were, 'fit in an unfit fitness'. But despite the varying circumstances in which they now find themselves and differences in their prior education and experience, most participants did not express reservations concerning this aspect of their training. Four out of five judged the level of their training as appropriate. Their judgements tended to be confirmed by their work supervisors; five-sixths of the participants' programmes were adjudged 'suitable', in terms of their current work assignments, by those supervisors who were interviewed.

A third problem in providing foreign study as a form of technical assistance is the potential conflict between the national interest and an individual's interest in earning a degree as a by-product or objective of his programme. That foreign students wish to end their study abroad in possession of a degree, both for its symbolic and its market value, is now true the world over. The programme under consideration here provided only a minority (about one in eight) of its participants with the opportunity to earn degrees for the most part at the Master's level. But both in their perceptions of the career-enhancing value of such a degree and in their stated preferences for much longer programmes of training, it was clear that the achievment of a degree was highly prized, and the chance to do so would have pleased most trainees greatly.

The chief virtue of a degree programme in the trainee's eyes tends, however, to be its defect with respect to national development: it can measurably enhance the returnee's chances for occupational mobility, which in turn may result in the loss of his potential contribution to development projects. Occupational mobility, often the primary hoped-for outcome of the overseas sojourn, tends therefore to be dysfunctional for the effective application of technological training in the service of development goals (Foster, 1965).

It is clear from these data, however, that such mobility typically is neither an immediate consequence of training nor even a uniformly probable fate of participants. Over one-third are still (in many cases five or more years later) in the same job they held when originally selected for training. Another one-third have moved, but only after returning initially to the same job. Only in the case of those who were 'groomed' for a new position through training does the programme seem clearly to have served as a channel for upward mobility. These objective data on job-changing are confirmed by the opinions of the trainees themselves. No more than a third expressly linked their training with subsequent occupational changes either

of a (usually) favourable or (infrequently) detrimental sort. The relationships between earning a degree in training, however, and both its perceived and actual consequences for mobility were close and affirmative: the receipt of a degree while in training measurably enhanced occupational mobility. The relation between mobility and the effective use of technical training is a separate issue, to be discussed below.

TABLE 4. Relation of training to occupational mobility, and to its perceived career value by participants: data grouped by regions (in percentages)

Occupational aspect	Region[1]			
	Latin America (N = 7 051)[2]	Far East (N = 6 990)[2]	Near East South Asia (N = 7 530)[2]	North Africa (N = 1 802)[2]
Patterns of mobility: selection, post-training, current job[3]				
Returned to same job, still in it	35	37	34	53
Returned to same job, changed since	36	39	39	17
Returned to new, expected job	14	14	15	15
Returned to new, unexpected job	12	8	9	13
Unemployed, inactive	3	2	3	2
Career value: without training current job would be[4]				
Worse (training helped)	28	29	24	33
About the same	61	58	64	49
Better (training hurt)	4	6	4	7
Cannot say	7	7	8	11

1. See Table 1 for list of countries in each region.
2. These are weighted numbers of participants, taking account of various sampling ratios in each country. Those who were NA on either item were excluded from the base in percentaging.
3. Data on jobs at three points in time—at selection, immediately upon return from training, and currently—reduced here to the dominant patterns of job-shifting with respect to the training interlude.
4. Question: 'Suppose you had not gone on this training programme, what kind of job do you think you would now have?'

Utilization of training

The main intended objective of foreign study as a mechanism of modernization is that the returned participant put it 'to use in opportunities where its use makes a difference to the national society' (Smith, 1964, p. 68). The use of an educational experience, even one which is closely linked with the performance of occupational roles, can have several meanings. It can mean simply doing the same job better; or transforming the character of the job; or instituting some new service or procedure; or it can mean teaching others, etc. Evidence of all these modes of use appeared in the interview data. For analytical purposes, however, use was conceptualized as a process involving a pattern of continuous employment; the

claimed (and validated) use, at least to some degree, of the training at work; the claimed (and validated) transmittal to others of the substance of training; and the existence of plans for further use.

Employment has been continuous for almost all (96 per cent). A large majority of participants claimed to have made effective use of training in their occupations. About half said they had made extensive use, and another quarter spoke of at least some use of their training; only one in five have made little or no use of it. Most of those who claimed to have utilized their training were able to specify the manner in which this was done, along the lines noted above. More than nine out of ten said they had passed on some benefits of their training to others, primarily through informal channels but also through lectures, formal training and in articles or other writings. This widespread 'multiplier effect' of training was corroborated for the most part by data gathered from the former participants' supervisors. Finally, over half of the participants still had some plans for using their training; the longer they had been back from training, the less likely was this to be so.

An index was constructed of the participants' claimed levels of use of training: at work and in conveying aspects of it to others. Those who did both to a considerable degree were classified as 'high utilizers'. Other combinations of responses were assigned to categories reflecting lower levels of use. After validation, the index was used as the dependent variable in a correlational analysis. Again, only a few results can be noted here in a short-hand fashion. First, the more 'professional' the character of training (e.g. at universities, for longer periods) the higher the utilization. This may be related, inferentially at least, to the nature of the fields in which training was taken. Those trained in 'technology-oriented' fields such as agriculture or health or transportation tend to show higher levels of utilization than those in 'people-oriented' fields such as public administration, community development or labour (see Table 5).

A second set of correlates had to do primarily with the organizational context of the participants. One key element was the trainee's supervisor: where he was viewed as favourably disposed to the transfer process, utilization of training was appreciably more likely to have taken place. The supervisor's role is revealed in other data from the survey to be that of an 'organizational gatekeeper': the more involved he was in the transfer and adoption process—selecting participants, planning their training, interacting with them after their return—the greater the utilization. Two factors which in turn strongly influenced the supervisors' degree of involvement were whether or not a formal commitment had been secured in advance as to how a subordinate's training would be used, and whether or not the supervisor had himself been trained abroad. Both of these sets of findings, centring on the function of supervisory authority as a key mediating influence on the utilization of training, can be interpreted as empirical confirmation of the view that variables linked with the trainee's organizational setting are crucial for the outcome of the technological transfer process.

TABLE 5. Utilization of training by selected correlates or factors: proportion who were 'high utilizers'[1] in each region

Correlate or factor	Region[2]			
	Latin America (N = 7 051)[3]	Far East (N = 6 990)[3]	Near East South Asia (N = 7 530)[3]	North Africa (N = 1 802)[3]
Type of programme[4]				
University only	49	53	32	21
On-the-job training only	40	39	31	28
Observation tour only	34	34	30	10
Duration of training				
Up to six months	36	33	31	10
Six months to one year	40	47	34	22
One year and more	48	51	36	21
Pattern of occupational mobility[5]				
Returned to new, expected job	55	50	41	30
Returned to same job	41	46	34	15
Returned to new, unexpected job	34	36	30	15
Career value: without training current job would be[6]				
Worse (training helped)	58	57	46	NA
About the same	36	41	31	NA
Better (training hurt)	34	37	26	NA
Help from supervisor in using training[7]				
Rated as very helpful	60	62	46	31
Rated as somewhat helpful	38	35	28	19
Rated as indifferent	27	35	24	10
Rated as not helpful	25	23	21	10
Time since completion of programme				
Up to three years	38	36	26	16
Three to four years	33	45	34	18
Four to five years	43	52	38	16
Five years and more	44	53	41	38
Proportion 'High utilizers'	40	45	34	16

1. Proportion who have used training at work and instructed others to a considerable degree since their return. (Those who have made lesser use of their training are not shown.) Comparisons are made only with respect to this 'High utilizer' grouping as a proportion in each of the categories of the various cross-related factors.
2. See Table 1 for list of countries in each region.
3. These are weighted numbers of participants, taking account of various sampling ratios in each country. Those who were NA within each region on either utilization or the cross-related factor were excluded from the base for percentaging.
4. These are only those who took programmes which were 'pure' in type, not combined with any other.
5. See Table 4, footnote 3, for further definition of these patterns.
6. See Table 4, footnote 4, for the source question.
7. Question: 'Your supervisor on your current job—does he help you in utilizing that training?'

Further evidence for this conclusion (not shown here) are some findings which indicate that the more fully 'institutionalized' the entire assistance

process, and the closer the subsequent pattern of contacts between participants and United States assistance programmes in their country, the greater the utilization. Programmes of training which were well planned, carefully integrated with larger projects for which prior commitments on job placement were secured from the employing organizations, and followed through with advice and material assistance, were clearly more effective. These findings lend strong support to the two-level conception of human resources development, in which attention is paid not only to the calibre of participants and training but also to the environments in which they are to be located upon their return. Job training must go hand in hand with 'job development' of many sorts.

Another finding of great theoretical import is the relation of utilization to the passage of time. From one perspective, foreign study can be seen as a 'wasting asset', whose value must or is likely to be quickly realized. Over time, occupational mobility can diminish the relevance of training, or motivation can erode under the pressures of prevailing work patterns or local traditions. Another view of directed cultural or technological change is that it is a slow but snowballing process, requiring time for the agent of change to effect a translation and application of a skill or idea to his local setting, or to gain needed support from others in his milieu for his innovative efforts. The data tend to support the second of these alternatives: utilization increases steadily with the passage of time, being at its low point in the first year after training and levelling off some five years after programmes were completed. This finding suggests that, in seeking to transfer knowledge and advanced techniques, often quite substantial amounts of time must pass before one can make firm judgements about the diffusion and eventual adoption of such highly complex cultural products.

Finally, the more favourable were the implications of training for one's career the greater the utilization. Personal gains derived from training, and more specifically the earning of a degree, do not seem to detract from the attainment of the development goals which the transfer process is primarily designed to serve. To the contrary, the two seem mutually supportive and certain types of occupational mobility may even be essential to the transfer process. For example, a programme of training which is the vehicle for achieving a new position of greater authority can make it more likely that innovative efforts will be made, or that they will have a wider impact. Again, as was noted, while the aims of training do not include occupational mobility, and in theory could be compromised by it, in fact such mobility tended to be functional for the transfer process.

Some pitfalls of a correlational approach

In exploratory fashion, and in line with a growing trend in cross-national research, we sought to relate the utilization of technical training by participants with a few structural attributes or indicators of macrosocial processes. A moderate degree of relationship ($r_s = 0.51 - 0.58$) was found to

exist between country rankings on three measures—of gross national product, higher educational enrolment, and human resources development—and their participants' levels of utilization.[1] Leaving aside the knotty problems of statistical adequacy of this 'sample' of units, or other important methodological strictures (Haas, 1966), one could see in this pattern of correlations some additional support for the argument that indigenous institutions ultimately determine the outcome of the transfer process. Countries disposing of greater wealth and which tend to invest in education more than others, tend also to show larger proportions of 'effective' recipients of technical training.

As seems true of most findings of this *genre*, however, there is more than a trace of circularity in them. Despite the static and often shaky nature of the measures employed, some students of comparative development, usually guided by a version of 'systems theory', appear to be persuaded that such correlations can be interpreted dynamically, even in terms of causation. Many of these investigations have had the merit of sensitizing the analyst of comparative social structure to underlying patterns and 'deviant cases', or of suggesting typologies useful for theory construction. (Lipset, 1959; Hagen, 1962; Cutright, 1963; Alker and Russett, 1964). But the main danger in these types of investigation is that the analyst, armed with a system concept, tends toward an overly deterministic interpretation. Such interpretations, unless carefully qualified, can be misleading if not harmful for future research as well as for policy in the field of development.

'The theorist is unable to enter the closed system and the planner has no real chance of breaking the vicious circle. Faced with the image of a whole host of intertwined variables changing simultaneously and in complex interaction, either may be led to desperate strategems' (Schnore, 1961, p. 243).

In warning against a too-literal application of system concepts to such data, others have sought to remind us of the 'looseness' of these institutional interrelationships (Moore, 1955; Anderson, 1963). Rather than reaching for premature theoretical closure at this point, we should acknowledge and seek to fill in the vast gaps in existing knowledge on the specific character and consequences of such forms of interdependence. In particular, the patterns of relationship between education and occupational structure in the developing nations must be studied more comprehensively before we can determine the precise contributions that foreign study can and does play in the modernization process (Lipset, 1964; Mitchell, 1965; Lipset, 1966).

A concluding note

The data reported in this paper came from a multi-nation evaluation study made primarily for administrative purposes. Although the surveys success-

1. The three measures were: G.N.P. *per capita* in 1957 (Russett, 1964, pp. 149-57); Students in post secondary education per 100,000 population (Russett, 1964, pp. 213-16); and a Composite Index of Human Resources Development (Harbison and Myers, 1964, pp. 31-48).

fully reached large numbers of former participants in a fair number of countries, the study instruments were limited in their scope of inquiry. The emphasis in the survey, as in the programme concept as a whole, was on the individual participant—his programme experiences and the consequences of his training. Few measures in the study touched upon the work organization or larger social structures which may affect the outcome of the transfer process. No information is available on the whole network of programmes and projects which comprise United States development assistance to these countries, of which participant training is only one thin strand. Yet it is impossible to assess any single aid programme in separation from the whole matrix of donor—host country relationships without a resulting loss of insight into the important ways in which the wider context affects the programme's outcomes.

This becomes clear even with respect to the implementation of this particular training venture, when we review findings which reflect the extent to which it was institutionalized. Greater value was realized by selecting trainees based on carefully scrutinized job or project needs; by intimately involving them in the programming of training; by securing firm commitments as to the placement and use of participants in advance of departure; by closely co-ordinating the programme with significant authority-wielding individuals in the immediate occupational environment; and by supporting trainees upon return with advice and material assistance.

Since the focus in the design of this survey was upon the individual rather than on the social systems of which he is a member, the finding that institutional arrangements in the home country are crucial for the process of technological transfer is all the more impressive. This was generally the case for participants from all regions, despite the many specific differences in the political, economic and social conditions in their constituent countries. Other students of the relation of foreign study to national development have reached a similar conclusion.

'Sufficient evidence is at hand... to make it clear that obstacles to the utilization of knowledge and skill *after return* are the strategic factor that limits the effectiveness of much foreign study' (Smith, 1964, p. 69; italics added).

This study only hints at some of the varied institutional structures and processes which may affect the transfer process. There are few reliable data available, for example, which could be used to test the role of an expanding or stagnant economy in the realization of the goals of foreign training, a general economic condition which is obviously of great relevance for the modernization process (Handlin, 1952). But it seems fairly clear, from the data at hand, that without an investment of energy and resources in an attempt to alter the broader social context for the performance of critical occupational roles in developing societies, the impetus to modernization implicit in programmes of technological education or instruction will be sharply curtailed. It remains for future research to specify the conditions, case by case, which make for changes that are deemed highest in priority,

and which among these last are realistically within the realm of the alterable in the short run.

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