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University of Pittsburgh, Ph.D., 1974
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ANALYSIS OF SOME FACTORS INFLUENCING
THE COMPOSITION OF
HIGHER EDUCATION IN MALAYSIA

BY

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requirements for the degree of
Doctor of Philosophy

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FOREWARD

My interest in the area of study of this dissertation originated during my involvement with the University of Malaya as a Research Fellow. I realized the tremendous importance of higher education for the national development of Malaysia and I became interested in the intricate and complex problems that educational policy makers and planners faced. I embarked on this study inspired by exemplary effort that is being made in Malaysia in the field of education with empathy for the problems faced and sympathy for the people involved in the dynamics of the development of education.

I decided to delineate a rather narrow topic from a complex syndrome and then widen the focus of research to include sociological, economic, administrative and organizational aspects. I can only hope the benefits of this multi-disciplinary approach outweigh its shortcomings.

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Needless to say, the responsibility for conceptualization, the conduct of the research, the findings and their interpretation rests solely with the author.

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ABSTRACT AND SUMMARY OF FINDINGS

This investigation focuses on the channeling of newly-admitted students into the various fields of study at the University of Malaya. The underlying issue warranting this study is whether the yield of high-level expert manpower supports the objectives of national development. In Malaysia as in many other developing countries, gross imbalances persist between the larger number of students opting for a liberal arts study program and the smaller proportion of students entering the technological-scientific fields of study. This phenomenon leads to the wider question of whether and how a multitude of societal institutions can influence the composition of higher education.

The process of primary and secondary schooling, which yields the prospective students for the University; the perceptions, decisions and actions of new students being channeled into the different fields of study; and the involvement of a number of institutions in this channeling process, are incorporated in a framework, mainly as an aid for systematic discussion.

The investigation re-emphasizes what has been widely acknowledge in Malaysia, namely, that the preceding levels of education in general and secondary schooling in particular are instrumental in determining the student's educational possibilities as well as the subject matter emphasis and form of the learning

process at the institutions of higher education. In other words, most of the new students entering the University have their options narrowed or their field of study predetermined by the course of their secondary schooling, especially by the persisting imbalances in the content and quality of this schooling, and the inequalities of educational opportunity.

A large and representative portion of the student generation entering the University in the Summer of 1971 was queried and analyzed as to educational and social background and perceptions, information available, preferences, aspirations, decisions, and regrets regarding higher education and employment. The analysis of this empirical information about students is interesting for two reasons. First, it facilitates the discovery of some of the main elements of the channeling process. Second, it is assumed that the student population represents society's educational preferences which determine the present educational system and which will have a bearing on the future system. But if this assumption does not hold and students in fact divert from commonly held beliefs, their aspirations and preferences could be instrumental in the evaluation of changes in the educational system.

Five main variables are felt to incorporate some of the most relevant aspects of the channeling process. They are: (1) market influences; (2) socio-cultural influences; (3) the effects of secondary schooling; (4) administrative incentives and controls; and (5) the university influence on public opinions. However, nothing is assumed about the complicated

underlying socio-psychological cause and effect relationships. Rather the purpose is to indicate that the various characteristics are either associated with or unrelated to the distribution of new students among fields of study.

Particular findings with regard to the channeling process can be briefly summarized as follows. Data on the influence of the labor markets suggest that information on employment opportunities is more readily available to students, is more accurate and also more closely related to students' choice of careers, as compared to information on earning potential and its influence on career-choices. It is also shown by related data that the employment structure at present acts as a constraining factor in the achievement of a balance in the output of graduates in the different fields of study because it is still influenced by traditional practices and values and the current pattern of economic and social activities rather than the emerging needs of development. Evidence that a large portion of those students aspiring toward careers as scientists or business executives, commonly thought to be instrumental professions for national development, pessimistically expect great difficulty in finding employment.

With regard to socio-cultural influences in the channeling process, the study indicates that the status of the family of an individual student has no significant bearing on his degree of motivation to pursue higher education. Thus students from both high-status and low-status families are equally motivated to pursue a study program. This finding disproves many previous

speculations. However, it was found that students from high-status families in a very significant number of cases have distinct advantages through a better schooling background thus enabling them to choose from a wider range of fields of study and particularly the ones with better employment chances and higher remuneration.

Achievement-orientation, measured in terms of differing expectations, does not vary significantly among students admitted to the various fields of study and thus has little direct relevance to the channeling process. There are some interesting findings that appear as by-products of this aspect of the enquiry. For instance, larger proportions of students with low status-origin ascribe importance to prestige gain while students of higher status-origin are more likely to strive for the achievement of higher income. The desire to avoid certain activities has frequently been suspected to have a bearing on students' choices of fields of study. There are indications that students shun specific tasks needed for national development for which their studies are supposed to have prepared them. On the other hand, it was found that half of the respondents indicated that they would not try to avoid any of the activities which were commonly assumed to be low on the preference scale. This could be indicative of a changing spirit and attitude of the young generation which could lead towards accelerated development. This aspect warrants more intensive research.

Regarding the influence of secondary schooling on the channeling of students into various fields of study, it is found that the mentioned imbalances can be traced mainly to the pattern and content of schooling. This finding was expected. Nevertheless a relevant discovery was made, namely that a significant portion of newly-admitted students are consciously aware of their restricted choice. However, a margin does exist for administrative actions to reduce the imbalance: mainly through referral to fields of study other than the students' first choice, reallocation of financial aid, and more widespread dissemination of information and counseling. At present, however, these instruments do not seem to be utilized effectively. The University itself does not reach beyond its own confines to influence the educational process that precedes it. Knowledge about the University's structure and processes is not widespread among newly-admitted students and in many cases the information is inaccurate.

A multitude of institutions have a bearing upon the channeling process and its characteristics. A systemic framework was applied as an organizing scheme to delineate and relate them. Several of the institutions were perceived of as having policy-making and controlling properties: mainly, the Governmental apparatus, the University itself, the family, the immediate community, the media, the school system and counseling. On the other hand, several other institutions are conceived of as having constraining influences. The discussion of institutions points out present shortcomings and implies the leverages for

affecting changes. However, the suggesting of definitive policies, organizational-administrative arrangements or courses of action was not intended in this study.

The main avenue to affect the composition of higher education emerges as a multi-faceted approach, in which the major aspects are the continued reorientation of secondary schooling, the reorientation of some of the aspects of the incentive system, the employment structure and employment practices all of which have to be adjusted to the needs of development. The mainstay of this type of educational planning is considered to be persistent and comprehensive efforts to evolve new aspirations, attitudes and work preferences and thus modify some traditional values to be more compatible with national development goals.

I. THE RESEARCH SUBJECT IN ITS PERSPECTIVE AND ITS DELINEATION

Within the wider context of education and manpower planning the particular aspect dealt with in this study is seen as the third of the three dimensions listed below:

- (a) forecasting of manpower and skill requirements in the course of national development.
- (b) Planning, funding and creating the physical facilities and qualified manpower for teaching and training.
- (c) Inducing, guiding and channeling of students into the fields of study that will yield the high-level expert manpower required for achieving national development objectives.

All nations that are aware of the fact that their societies are engaged in development, face the problem of finding a balance in human resource development of which higher education is an integral part. Solving this problem requires recognition of a very strong likelihood that the free play of economic and social forces in the field of education and manpower development are not necessarily supportive of the desired course and goals of development. In a stagnant society, or in a society that is subject to slow evolution, the educational system is a means to perpetuate the values and traditional skills of its people. In contrast, societies which are actively committed to influencing

their social structure, to strengthening their material base and to improving the quality of life by dynamic, purposeful development, the educational system becomes a prime instrument. In fact, we can look at education as a mobilizer and necessary ingredient for the attainment of "higher" levels of socio-economic development. But it has to be recognized that the educational system is fundamentally interlocked with the existing socio-economic environment. A few of the many problematic behavioral and technical aspects are pointed out below.

In most cultures, education and especially higher education is sought by each individual for his enhancement and satisfaction, rather than for the benefit of society. The "free" choices of individuals as to their field of study and their careers are strongly influenced by cultural values and traditions.

Education provides a means for upward social mobility for those in the lower strata of society. This is increasingly recognized in developing countries where social mobility is otherwise impeded. For that segment of the population already in the upper strata, education is often a consumer good. Most often a consumer good that does not readily respond to economically determined supply and demand factors.

Institutions of higher education are not simply units of the economy, but complex organizations with multiple functions for society--political and cultural as well as economic. Thus manpower upgrading is only one of the outputs of the educational system.

Higher education is one of the prime agents for change but at the same time the institutions of higher education are

products of the societies in which they operate. Embedded in such social complexity, higher education can be found to support a continuous oversupply of skills which have a minimal chance of finding meaningful employment. Conversely, there may be a very limited supply of such skills for which employment opportunities exist since the content and methods of higher education lack relevancy.

With regard to the technical aspects, we do not really know the optimal output-combination of skills and levels of education conducive to realizing societal goals and aspirations for the future. Exact forecasting of the demand of university trained expertise in all fields would be an important basis for planning. The difficulty is, that in the course of socio-economic development, restructuring, and cultural reorientation, the forecasting of such a demand for high-level expertise cannot be based on extrapolation of past and present demands but becomes a task of dealing with increased unknowns and uncertainties.

Even if we could classify all functions and tasks to be performed in the course of national development, a precise allocation of people to tasks would be close to being impossible because of the high degree of substitutability and the variability of productivity. Many types of university-trained manpower can fulfill a variety of tasks, e.g., scientists become teachers, engineers perform managerial functions, etc. Likewise, output and man-hour requirements are elusive concepts in the realm of university-trained skills.

Some oversupply of highly qualified manpower over immediate demand is desirable since this will cause substitution of less-qualified by higher-qualified personnel. Also to some extent an oversupply of highly-educated manpower could create its own demand. For instance, university-trained experts often turn entrepreneur and become self-employed. Furthermore, scientific-technological orientation, cultural creativity, and initiative in all areas of social life are more likely to come about with easy availability of highly educated manpower.

Considering these problem-syndromes, it is not surprising when a widespread opinion prevails that it is still the optimal policy to educate as many as possible to as high levels as possible, thus affording the fullest development to the greatest number of individuals. It is argued in the laissez-faire fashion, that the interest of the nation is served best if every individual is given complete freedom of choice to study what each perceives as being most advantageous. At the same time society and its development will benefit most if each individual decides for himself what form and content of education is desirable. The Government's function in this "demand-oriented planning approach" is to provide the facilities, funds and teachers to meet the present and expected popular demands. However, it is overlooked in the above point of view that in today's highly organized and complex societies, the individual's aspirations, satisfaction and personal enlightenment through education quickly turns to despair if he cannot find meaningful activity. Moreover, society will incur losses if the educated are misallocated or usurp jobs

for which they were not trained. Furthermore, a proletariat containing a large segment of educated but unemployed individuals constitutes a threat to the stability of any political system. Only recently has the link between education and the fulfillment of meaningful tasks in society been more explicitly recognized and given educational planning a new dimension: forming a nexus between the provision of education and society's economic and social life in general, and its development goals in particular.

From the foregoing it follows that education cannot really be considered a self-contained area for planning purposes. Only by integrating educational planning with overall planning can it be hoped that the problems of the "educated unemployed" on the one hand, and the shortage of trained manpower on the other will be avoided.

In the following tackling the many aspects of planning of higher education in general, or finding a solution for the optimal educational composition for achieving Malaysia's national development objectives in particular will not be attempted. The proposed study acknowledges the comprehensive aspects of educational planning but focuses its concern on the problem of guiding pupils' entry into the different available types and fields of higher education.

The decisions of young people and their parents as to the source of their education, if they are based on traditional criteria, might be contradictory to their own interests and planned national development objectives. Also, the educational system, including the institutions of higher education may be

inflexible to the new demands thrust upon them. Thus the study will attempt to shed some light on the somewhat neglected aspects of how popular demand determines the present composition of higher education. As Coombs¹ sums up this area of concern:

....while many more people want more education, they do not necessarily want the kind of education that under new circumstances (development) is most likely to serve both their own future best interests and the best interests of national development. Most students naturally hope that education will help them get a good job in their developing society. But their job preferences are often dictated by a prestige-carrying hierarchy of manpower requirements bearing on economic growth. When the incentive-structure and the employment demands of the marketplace also reflect the old hierarchy of prestige, there is serious disfunction between the nation's manpower needs and its actual manpower demands. Such a disfunction is usually a signal that the nation is not deploying its available educated manpower in ways most conducive to development. Thus the student in choosing an academic field, and the educational system trying to change its student flows to match the requirements of national development, are both caught in the cross-tensions between the stated development goals of society and society's antidevelopment patterns of prestige and incentives.

The disparities between students choosing an academic field and the educational system trying to change its student flows to match the requirements of national development are reflected in Malaysia in the grossly unbalanced proportion of students choosing the liberal arts course of study compared to the students choosing the scientific-technological fields. Even though the nation's leadership recognizes the disadvantages of such allocation, the

¹P.H. Coombs, The World Educational Crisis, New York: Oxford University Press, 1968, p. 7.

necessary adjustments are slow for several reasons:

- (a) the educational system has to create its own reorientation and generate its own manpower to accommodate reallocation of students. This process involves several "production cycles" from students to teachers, to build up to the threshold where change gains sufficient momentum. At the same time the educational system is embedded in the prevailing value system which could conceivably constrain the supply of teachers with relevant qualifications.
- (b) Furthermore, the educational system, including the University, is subjected to the social and cultural values which control or guide, stimulate or restrain students' and parents' values and aspirations, thus affecting the demand for various kinds of education.
- (c) In addition, the educational policies and processes in Malaysia are affected by the special implications of a multi-racial and multi-cultural society.

At this point the Malaysian situation warrants an outline of some of the specific problems. The objectives of planning of higher education in Malaysia have several dimensions:

- (a) the achievement of a balance of expertise more in line with the demands of national development.
- (b) The provision of higher education at high standards for a larger number of aspirants.
- (c) The equalizing of opportunities in higher educational for all ethnic segments of Malaysia which for all practical purposes means, enabling more Malays to enter into a variety of professions from which they were, hitherto, excluded or they chose to avoid.

This investigation is not designed to analyze the complementing and conflicting aspects of this mixture of objectives nevertheless

some elaboration of the Malaysian situation may be useful.

Based upon inferential evidence, the researcher hypothesizes that the policy of furthering the entrance of more Malays into higher education is the most immediate goal of those holding the political power. It is further inferred that this conflicts, in the short-run, with the goal of achieving an increased output of university trained expertise in some of the hitherto under-supplied skills in the scientific-technological categories. On the other hand, if the above goals are realized they are likely to be accompanied by a decline in the educational standards, at least in the short-run.

No quantitative proof is provided,² but extensive field evidence in the form of interviews with knowledgeable educators, administrators and advisors bears out:

- (a) that the balancing of the student-intake between the liberal arts fields of study and the technological-scientific fields of study could be achieved³ but the incoming students would be largely non-Malays;
- (b) that larger numbers of applicants meet the present minimum standards for admission and could be admitted without endangering the standards at the University, provided financial

²It would have been impossible to collect data for these aspects because of official resentment and the lack of relevant records.

³If the physical and manpower requirements could be met by the respective faculties and if the admissions criteria could be slightly modified, not generally lowered.

resources, physical facilities and the academic manpower,⁴ could be made available; again, however, the additional intake would largely favor non-Malays;

- (c) that there are presently not enough Malay applicants, who meet the admissions criteria,⁵ to bring about a balance between the liberal arts and the scientific-technological fields of study and ultimately result in placing more Malays into the professions.

The underlying policy issue for the context of this study is:

how to balance higher education between the liberal arts and the sciences, and that means, how to channel more students into the scientific and technological fields of study and how to reconcile this objective with the objective of drawing more Malays into the scientific-technological professions.

A. Objectives and Applicability of Study

It is the researcher's contention that given the complex situation, a planning approach centered solely on the supply of educational facilities will not result in achieving its objectives.

⁴In view of the policy of changing the medium of instruction to Malay, academic instructors proficient in this language will be a severe constraint.

⁵Even if the admissions criteria for the science and technological faculties were lowered, the proportion of eligible Malays would not increase (compared with non-Malays). If admissions criteria were lowered, but the standard of graduates maintained, the University would have to provide lengthened study programs to accommodate significant numbers of new students in the science and technological areas.

Those involved in manpower planning or educational planning have often suggested that added capacities in the hitherto neglected fields of study are all that is needed to produce a greater output of scientists, engineers and doctors. It is often overlooked that these additional capacities are unlikely to be utilized if the popular support and demand for these types of education is lacking.⁶ Moreover, even if the additional capacities and facilities can be provided at the universities through governmental persistence it is unlikely that students will avail themselves of them in great numbers, partly because their previous educational background did not prepare and inspire them to do so, and partly because the traditionally more appealing fields of study provide an alternative way of least resistance in order to obtain a degree.

In a social system in which there is no intention of rigidly controlling the individual's decisions, insight into the decision-making processes of the individual is of major importance in guiding decisions toward socially and politically desirable goals. In the case at hand, this means to reconcile the intake pattern of students and the projected high-level manpower needs on the one hand, and to affect the ethnic composition of high-level manpower, on the other.

The practical applicability of the study is twofold. First, it can be used to gain an insight into policy goals for

⁶In Malaysia there is evidence in the form of a vocational secondary school stream that had to be abandoned because of lack of support and popular interest.

higher education and to view them in relation to the actual allocation of students among the fields of study. Second, a means is provided to analyze and extract the major variables of the process of channeling aspirants of higher education into various fields of study.

It is hoped that a clearer, and empirically verified picture can be obtained of how and to what extent popular preferences determine the present composition of higher education. The most obvious manifestation of the phenomena in Malaysia is that a disproportionately large share of university education centers around a liberal arts orientation in the face of great need for scientifically and technologically trained manpower. If we gain better insights into the social, cultural, economic and administrative inputs into decision-making and guidance, we might be able to infer and recommend more effective instruments for influencing the composition of higher education. The insights gained could provide information for policy formulation and suggest the institutional arrangements to employ instruments affecting the composition of higher education.

1. Set of Main Hypotheses

The study is guided by an overriding hypothesis, namely;

....that the channeling of students into various fields of study, and the resulting composition of higher education, is not supportive of the objectives of manpower planning for high-level expertise.

The explanatory analysis will be organized into a set of five main hypotheses, each dealing with one of the cluster of

aggregated elements indicated as follows:

- (a) market factors;
- (b) socio-cultural influences;
- (c) effects of content and pattern of secondary education;
- (d) administrative incentives and controls;
- (e) university influences.

Subsequently the main hypotheses are formulated as follows:

....that under the present circumstances in Malaysia, the market for university trained expertise does not exert a significant influence on the aspirants to higher education;

....that socially and culturally determined status and achievement-orientation exert significant influence on the decisions regarding fields of study and careers;

....that the limited choice at the time of entry into higher education is perceived as a restriction by a significant number of applicants and that the unpreparedness of students in critical areas of knowledge acts as a restricting factor;

....that the administrative incentives and controls are not significantly effective in channeling students into the undersupplied fields of study;

....that the University does not effectively influence the aspirants to higher education as to their choice of field of study.

II. CONCEPTUALIZATION OF A FRAMEWORK OF THE INSTITUTIONS AND PROCESSES INVOLVED IN CHANNELING STUDENTS INTO THE VARIOUS FIELDS OF STUDY

A framework is proposed to facilitate a systematic analysis of the entire process of channeling students into various fields of study, the components of this process and the linkages between them. The framework will also be of assistance in delineating and conceptualizing the elements in the channeling process, especially the five main variables on which the empirical research focuses. At the same time, the framework manages to maintain the perspective of the intricate complexity out of which only a limited number of elements are isolated for the purpose of analysis.

A. The Framework of the Channeling Process

1. Outcome, i.e., the Allocation of Newly-Admitted Students Among the Faculties

The outcome of the channeling process is constituted of the percentage allocations of students to the various faculties out of the total intake of new students. There exist data on these allocations for a number of years, as indicated by TABLE 1. The data of previous years are of interest for viewing them against projected manpower needs; thus providing evidence for the underlying hypothesis:

that the channeling of students into fields of study is not supportive of the objective of manpower planning for high-level expertise.

TABLE 1: ALLOCATION OF NEWLY-ADMITTED STUDENTS
TO THE VARIOUS FACULTIES AT THE
UNIVERSITY OF MALAYA, 1960-1972

Academic Year	in % of Total Admissions						Total Admissions
	Economics ¹⁾ & Admin.	Arts	Sciences	Engineering	Medicine ²⁾	Agriculture	
60/61		58	19	18		5	359
61/62		58	22	14		6	439
62/63 ³⁾		—	—	—		—	
63/64		—	—	—		—	
64/65		—	—	—		—	
65/66		59	17	9	11	4	1087
66/67	10	55	14	7	10	4	1396
67/68	20	40	19	7	10	4	1304
68/69	20	39	20	7	10	4	1436
69/70	20	42	19	7	7	5	1855
70/71	21	46	18	8	4	3	2266
71/72	21	48	18	7	3	3	3150

1) The Faculty of Economics and Administration was separately established from the Arts Faculty in 1966

2) The Faculty of Medicine was established in 1965

3) Data for three academic years could not be obtained at the time

2. Inputs Into the Channeling Process

Inputs are defined here as that portion of the aspirants who are actually admitted to the University of Malaya for the academic year 1971/72. There are several other groups of aspirants to higher education:

- (a) high school pupils who applied for admission but were deferred or turned down;
- (b) high school pupils who aspired to higher education but did not actually apply. Several reasons are assumed to be at the root of abstention:

- i. chances for admission were perceived to be very low because of ample competition from students with higher test scores;
- ii. chances for admission were perceived to be low because of imagined or real bias in the administrative admission procedures;
- iii. financial burden could not be borne and chances of obtaining governmental aid were perceived to be very slim;
- iv. students had aspired toward continuing education but were eliminated in the selection process when trying to enter Forms V or VI;

(c) Malaysians who begin their studies at foreign institutions of higher education.

All three groups are of significant proportions and it is a major disadvantage that these elements had to be excluded from the study because not enough information was available or accessible for this study. The University of Malaya, for instance, does not retain any data on unsuccessful applicants. There is no research or information available on the extent of the latent aspiration for higher education of many secondary school pupils. Students who begin undergraduate studies abroad are only to some extent supported by the Malaysian Government and the initiative and support of many others is mostly private and therefore detailed statistical assessment is not possible.

The intake of first-year students into the University of Malaya constitutes, therefore, only part of the aspirants to higher education. TABLE 2 compares the numbers of applications with the numbers of admissions. Even though insight into the motivation, attitudes, inclinations of all aspirants would be

immensely important for the overall picture, the researcher had to be content with limiting the analysis to a target-population which was already subjected to a selection-process. The process that led to their application and admission is likely to contain biases, which renders the target-population less than a faithful representative of all the aspirants to higher education. The lack of information allows only the crudest assumptions as to possible biases. Reference to the excluded portion of the overall population of aspirants will be made wherever the researcher dares to make casual inferences.

TABLE 2: APPLICATIONS AND ADMISSIONS TO
UNIVERSITIES, 1967-1972

Academic Year	Applications received by Universities	Admitted to Universities
67/68	3744	1304
68/69	4166	1436
69/70	4568	1855
70/71	4739	2266
71/72	5942	3150

Data supplied by the Office of the Registrar,
University of Malaya

A conceptual difficulty is apparent in that the period in which the choices with respect to the fields of study were made cannot be pinpointed to the short period of time between the completion of secondary school and the commencement of studies at the University. The social and cultural pressures and particular circumstances that ultimately resulted in the joining of a certain faculty, influenced the individual student's decision-forming process throughout his entire formal and informal

educational experience. The framework includes an abstraction in so far as the various influences exerted upon the pupils and students over time, are assumed into the time span in which the transition from high school to university takes place.

3. The Channeling Process

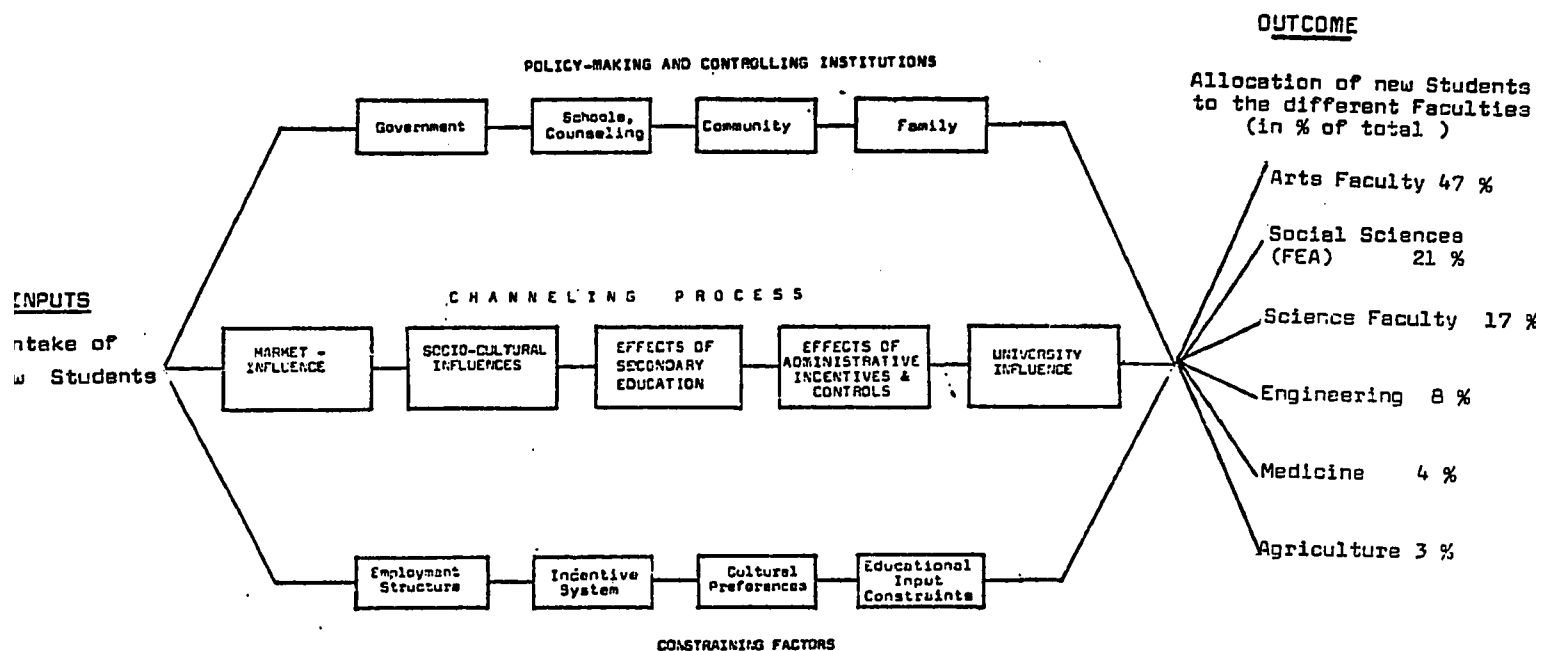
The channeling process is conceived of as being composed of five "main variables". However, it is realized that these elements are not self-contained but rather intricately linked to the institutions and processes of education and society at large. Some of these important institutions are conceptualized as "policy-making and controlling institutions" or as "constraining factors".

When abstracting complex processes into a limited number of variables¹ and linkages² among them, one is certain to simplify to a great extent. One cannot do complete justice to the complexity of the real world and decisions have to be made on trade-offs between an unwieldy complexity and an unrealistic simplicity.

¹Variable is defined here as a characteristic which can have more than one value in terms of quantitative gradations (measurements) or qualitative gradations (classifications).

²Linkages are defined as relationships without quantitative specifications or indications of their direction.

CHART 1: FRAMEWORK FOR THE CHANNELING PROCESS



The following five main variables of the channeling process are assumed to contain all that most directly bears on the channeling of applicants into the fields of study:

- (a) market factors;
- (b) socio-cultural factors;
- (c) effects of secondary education;
- (d) effects of administrative incentives and controls;
- (e) university influences.

4. Policy-Making and Controlling Institutions and Constraining Factors

The main variables of the channeling process are influenced by policy-making and controlling institutions and

affected by constraints. The scheme in CHART 1 does not purport that the indicated linkages will be empirically evidenced nor statistically verified. In the first instance, the scheme serves as a rationale for concentrating the analysis on the five main variables of the channeling process and verifying their significance. The bulk of the primary data collected will serve in this context. But linkages to the relevant institutions will be pointed out and appropriate observations incorporated.

As was pointed out in the introductory sections, the study is intended as problem-related research and thus any insights gained through analysis will suggest the instruments for influencing the ongoing process into desired directions and toward specific goals. The institutions involved in the channeling process employ the instruments and thus provide the leverage for change.

The analysis focuses on three aspects within the framework.

- (a) One is the educational process yielding the intake of students for the University. This is a complex subject matter and in the context of this study only those aspects which have a direct bearing on the variables of the channeling process are dealt with.
- (b) The second aspect comprises the perceptions and decisions of the newly-admitted students with regard to the various fields of study, i.e., the faculties they enter. An assessment of the influences of each of the main variables in the channeling process is attempted.

The bulk of the data obtained through the survey of newly-admitted students, provide primary evidence for the respective sets of hypotheses. The researcher relies

to a large extent on the perceptions and actions on the part of the students. This is justified by the contention that what students think, not necessarily objective facts, provide guidance as to students' preferences, choices and restrictions.

- (c) The third aspect deals with the description of the policy-making and controlling units and the constraints and their respective bearing upon the main variables. The researcher relies partly on factual information, partly on impressions gained through personal interviews and general observations made.

III. OBJECTIVES, STRATEGIES AND IMPLEMENTATION OF PLANNING OF HIGHER EDUCATION IN MALAYSIA

A. Overall Objectives and Policies for Education and Evaluation of Goal Achievements

Post-war and especially post-independence educational policies can be categorized according to three major goal-complexes:

1. shifting "education" from being a consumption good for a few, to being a universal right;
2. "education" as an instrument for nation-building;
3. "education" as an instrument for socio-economic development.

These objectives and the related educational policies overlap to some extent. Nevertheless, it is possible to distinguish phases in which one or the other goal was of overwhelming importance. If these phases of policy-making are analyzed in light of the major goals, they can be summarized as follows.

1. Education as a Universal Right

The early concern of the pre-independence and post-independence educational efforts was for the provision of primary education on the widest possible basis.

The provision of facilities and manpower was a tremendous task which has essentially been accomplished in that 92 percent of the children in the primary school age group are

being enrolled.¹ Attention is still focused on increasing the ability to stay in school and especially on increasing the participation rate of the Malay segment of the population. A major ongoing concern is the continuation of schooling for as many as possible beyond the primary stage. The First Malaysia Plan (1966-70) states this goal:

....to provide educational facilities, particularly at the secondary level.²

2. Utilizing Education as an Instrument for Nation-Building

The two instrumental aspects utilized in government policies are:

- (a) a common curriculum designed to cultivate national unity;
- (b) the gradual emphasis of one national language.

The common curriculum and syllabus has been achieved to a very significant degree. Partly through the administrative machinery directing and controlling the schools, and partly through the instrument of centralized examinations which are based on a standardized syllabus. The Education Review Committee 1960 could state:

....common syllabuses and timetables have been promulgated for use in all schools so that whatever language is used, all pupils learn the same things in the same way with the object of fostering a national Malayan outlook. In these ways, the desires of Malaya's main racial groups are

¹Mid-Term Review of the First Malaysia Plan 1966-70, Kuala Lumpur: Government Printer, 1969, p. 102.

²Ibid.

reconciled with the needs of the Malayan nation, in schools attended by all the nation's children.³

The question of language of instruction proved to have formidable implications due to the social and cultural insulation in which the racial and communal groups remained throughout the colonial period. Only a protracted step-wise implementation was feasible.

The ultimate objective of educational policy in this country must be to bring together the children of all races under a national language as the main medium of instruction, though we recognize that progress towards this goal cannot be rushed and must be gradual.⁴

The Education Act of 1961 provided that primary education be conducted in the country's four main languages, with Malay and English as compulsory subjects, while in secondary schools the medium of instruction would be either Malay or English. Observations substantiated in other chapters, seem to indicate that the Malay-medium schools are disadvantaged mainly due to the shortage of qualified teachers in the science, mathematics or vocational subjects who can teach in the Malay language. Recently the Government has indicated that by 1985 the only medium of instruction will be Malay in primary and secondary schools.

The Second Malaysia Plan (1971-75) has as one of its objectives:

³ Report of the Education Review Committee 1960,
Kuala Lumpur: Government Printer, 1964.

⁴ Rahman Report, Kuala Lumpur: 1957.

....the promotion of national unity among the various races in the country and at all levels of society.⁵

The educational system plays an instrumental role by:

....promoting national unity, especially by reducing imbalances and improving the distribution of educational opportunities between regions of the country and between educational media and by qualitative improvement of education.⁶

The goal of language unity has not been fully accomplished as of 1971, but the path for its achievement is charted, and, without doubt, the persistent efforts of the Government will bear results with successive generations of school children.

3. Education as an Instrument for Socio-Economic Development

In the early sixties consideration was given to the problem that a developing country like Malaysia could not really facilitate education for its own sake, but needed to integrate educational efforts with all other aspects of socio-economic development. The prior educational system had placed great emphasis on general, academically-oriented education, but the Comprehensive Education System, instituted in 1965, was designed to offer pupils a range of education and training for occupations for which there would be an increasing demand.

Estimating manpower and skills required in the future is still an imprecise exercise and at best only crude trends can be predicted. Even more difficult is the task of gearing an educa-

⁵Economic Planning Unit (EPU), Development Circular No. 1, 1969: The New Economic Policy, Kuala Lumpur: 1969.

⁶Second Malaysia Plan 1971-1975, Government Printer, Kuala Lumpur: 1971.

tional system to respond to anticipated manpower needs. The knowledge and methods of teachers are not easily changed or replaced. Since teachers are themselves an output of the system, significant qualitative changes in an educational system may require at least one "production cycle," and massive changes may require many cycles. The Comprehensive Education System may still require considerable time and effort before it becomes fully effective in achieving its aims. Present problem-areas are stated in the Mid-Term Review:⁷

....that implementation of certain key programs has lagged behind on account of teacher, financial and implementation constraints.

This refers mainly to the shortage of facilities and highly qualified teachers in the science and mathematical subjects and in all vocational subjects. It also refers to the slow acceptance of technical-vocational education, not as second best to general-academic education, but as an equally valued alternative.

Another bottleneck seems to be the shortage of professionals in the technical fields on all levels in the administration, who could competently pursue the goal of increasing the quality and quantity of technical education. The Aziz Commission cited in 1968 that:

....insufficient emphasis had been given to the role of technical and vocational education in the context of the comprehensive education system and in the present phase of the country's economic and social development. The Technical Education Division in the Ministry

⁷Mid-Term Review, op. cit., p. 101.

of Education appears to be lacking both in administrative and professional staff in terms of quality and quantity; nor is its capability commensurate with the priority assigned to technical and vocational education.⁸

The Government is fully aware of the nexus between education in general, manpower resource development more specifically, and socio-economic development. The broad strategy and policies are laid out but implementation efforts have to continue for many years before the whole range of subject-content can be taught effectively in all schools and on all levels.

The Second Malaysia Plan (1971-75) gave new emphasis to the nexus between education and economic development, and reiterated the goal of national integration by linking the objectives:

....to raise the productivity and income of those Malays and members of other communities who are now in economically weak positions and to increase Malay participation in modern sector activities to increase the rate growth of employment to achieve a satisfactory rate of growth of overall output.⁹

Education can be an input in attaining these objectives, but as the UNESCO Mission stated,¹⁰ the specific educational policies to be applied in the context of competing or even conflicting objectives, were not clear at that time.

⁸Report of the Royal Commission on the Teaching Services, Aziz Report, Kuala Lumpur: Government Printer, 1969, p. 31.

⁹EPU, The General Framework of the Second Malaysia Plan 1971-75, op. cit.

¹⁰UNESCO and the International Association of Universities, "Country Profiles" in Higher Education and Development in South-east Asia, Vol. II, 1967.

B. Specific Objectives and Policies of Higher Education

How does planned and unplanned progress in education relate to the development of higher education? Is the university an integral, synchronized, component of the educational system? What particular objectives and policies does the university pursue?

In 1962 a Higher Education Planning Committee was established under the chairmanship of the Minister of Education, and including other Ministries as members. The task of this Committee was to be an extension of the work of the Education Committee of 1956 which compiled the Razak Report, and the Education Review Committee of 1960 which resulted in the Talib Report in which special attention was given to tertiary education. The Committee's terms of reference were:

To review the arrangements in the Federation of Malaysia for Higher Education and to make recommendations for the development and improvement of such education in the light of the foreseeable needs and financial resources of the country.¹¹

Since the deliberations resulted in establishing the University of Malaya in Kuala Lumpur, the Higher Education Planning Committee was the first systematic approach to assessing the position and further development of higher education. The Committee interpreted its task:

Whatever proposals are considered for the expansion of education at the higher level,

¹¹Report of Higher Education Planning (HEP) Committee,
Kuala Lumpur: Government Printers, 1967, p. 163.

they should be consonant with the basic education policy....of promoting cultural, social, economic and political development as a nation.¹²

It was also acknowledge that:

Modern concepts on educational expansion in developing countries also underline the importance that educational needs must be considered in relation to economic, social and cultural demands and the necessity to raise the general standard of living of the people.¹³

There seems to be a clear indication that the two goal-complexes of "education for nation-building" and "education for socio-economic development" are recognized to be guidelines for Malaysian higher education.

On the level of tertiary education, the implications of manpower planning in support of socio-economic development are very much more complex than for the lower levels of education. Besides, a university is likely to develop its own organizational dynamics which do not necessarily tend to make the processes of tertiary education more adaptable to the needs perceived by the Government.

The margin of formal autonomy of the university is very slim, since the superior governing and policy-making organ, the Council, is manned by political or administrative office holders from the Government. A considerable measure of autonomy is retained, however, with respect to what is being taught, how,

¹²Ibid., p. 179.

¹³Report of the Higher Education Planning (HEP) Committee, op. cit., p. 179.

and under what conditions within the individual faculties and departments. It seems that academia defends this area, claiming ability for better judgement and the Government largely respects this assertion. On the other hand, budgetary appropriations, and with it the proportioning of faculties and departments are ultimately settled by the Council, especially the most influential and decisive, Finance Committee.

The University Senate which represents the University's own self-governing body, exclusively made up of University staff, witnesses frequent overruling of its own recommendations to the Council. In interviews with Senate members, it was repeatedly mentioned that the Council's contravening decisions were often necessary since the departmental power-play within the Senate might not always result in rational decisions which would be consistent with a national educational strategy. This does not speak well for widespread confidence in the University's capacity for autonomous self-government. From interviews with Senate members, one feels that an opinion seems to prevail that a systematic, long-term, national strategy for higher education does not exist, or at least that such a strategy is not recommended to the levels most immediately concerned. The Higher Education Planning Committee has not been active since the publication of its 1967 Report. Among the Senate members it is not known whether the members of the Committee still meet or whether and how the membership has changed.

Recently one main issue became the focal point for policy consideration--the question of quality versus quantity

of higher education. The number of school-leavers attaining the minimum requirements for admissions into the various university faculties has been increasing over the years. This is mainly due to increasing participation rates in secondary schooling. Out of the students with the minimum requirements, larger proportions are opting for continued education at the university level. The cut-off points are determined by the admission capacity that the Senate, the Council, and the Ministry of Education agree upon in view of existing facilities and financial allocations.

Absorption of applicants from the science-stream is relatively high because the school system produces a smaller number of school-leavers in the science-stream. Still a considerable number of applicants in these fields are turned away. Qualified applicants for the Science Faculties tend to come from large urban schools in which the preconditions for the effective teaching of science are more favorable. Also, the student-intake in the Science Faculties has a larger proportion of non-Malays, and pupils from English-medium schools. Consequently, the participation of Malays in the Science Faculties was for many years, and is still, grossly disproportionate in relation to the racial breakdown of the population. In this way the question of quality and quantity in higher education is immediately linked to political and communal implications.

Two ways to remedy the self-perpetuating tendencies are conceivable. One is to apply different admission standards for Malay and non-Malay applicants, which would appear

to be a very strong discriminatory measure. The other possibility is to award scholarships to promising Malay aspirants and prescribe that all holders of scholarships who also attain the minimum requirements are to be admitted, regardless of their ranking among all the applicants. This is also a discriminatory measure, but it appears to be feasible. Still another possibility, is to admit underqualified applicants into study programs which are lengthened and designed to remedy the disparities in their background.

The absorption of applicants from the arts-stream into the Faculties of Arts or Economics and Administration is proportionally very much lower in the face of large numbers of students in the arts-stream. The proportion of Malay applicants is very much higher than in the Science-oriented Faculties. Political pressure seems to center on this one avenue which is accessible to larger numbers of Malays. It seems that the cut-off point for admissions had to be set lower to accommodate the larger numbers. Even then, some well-informed interviewees confirmed that the agreed upon numbers of new students had to be exceeded due to political influences. Thus it was possible to achieve an overall balance of university students, slightly in favor of the Malays, but this was achieved by increasing the overall enrollment and giving a disproportionate boost to the Faculties of Arts and Economics and Administration, compared to the Science-oriented Faculties.

The academic community of the University was expected to take it upon itself to safeguard the standards, possibly even improving them, in the face of rapid expansion. The fact that

the problem was acute was realized so much so that the Faculty of Medicine and the Faculty of Engineering instituted an additional preparatory study year for underqualified students.

Observations and opinions gathered in interviews seem to support the hypothesis of many of the academic staff that the quality standard of the output has so far been maintained. This can be accredited to several factors; namely, the slightly increased quality of upper-secondary schooling; the numerical increase in more highly qualified instructors at the University; and measures such as the additional study years.

At the same time, it has been conceded by the academic community that a much-desired increase in quality through intensification of the educational processes was not achieved, which is supported by the fact that the student-instructor ratios in most instances increased rather than decreased. Also, the graduate study programs for more advanced degrees did not reach beyond small beginnings, and the addition of new faculties or courses of study did not proceed as had been hoped by many of the academic community.¹⁴

Manpower planning approaches in Malaysia do not differentiate between the different levels of higher education. The overwhelming majority of students conclude their academic training with the first degree. The relatively very small number of students seeking higher degrees have in most cases studied abroad. All graduates, on whatever level, have so far been

¹⁴See Newsletter, Mahasiswa Negara, June 1971.

readily absorbed into gainful employment. Only recently has some concern been voiced about the danger of over-production of graduates, especially in the humanities. Officials concerned with manpower assessment are, however, of the opinion that over-production of graduates will not be a problem if:

- (a) the productive and organizational processes in the economy continue to grow at the experienced rate;
- (b) the educational process can adjust itself to the demand situation and produce expertise in a balanced proportion among the Sciences, Technology and Humanities and between professional and academic training;
- (c) the quality standards of university output is sufficiently high to be of value to employers;
- (d) the intellectual and creative capacity of the graduates is high enough to fulfill the function of providing a driving force for further development.

The impression gained was that there is an increasing concern for the latter two aspects. In several faculties, there are intentions to widen graduate study programs, the main constraint being the shortage of highly qualified teaching staff. The Ministry's recommendation to stabilize the student number at the University of Malaya to around 8,000 may also have been made in view of the continued rapid expansion and it may be conducive to consolidation, intensification and a deepening of the educational process at the University.

To summarize the policies concerning the question of quantity versus quality, it seems that no clearcut strategy exists on the part of the Government. It can be cautiously inferred that the Government's concern was with the expansion of higher education in terms of numbers. The academic community

and the institutions of higher education were implicitly trusted to safeguard quality standards. However, in the face of rapid expansion the question of elevating quality standards remained in the background. The present concern with, and the future implementation of, more intensive and advanced degree study depends on the respective initiative from the academic staff, its leadership in the faculties and corresponding financial support from the Government.

The recent intensification of the language issue added a further dimension insofar as it will prove difficult in the short- and medium-run, to provide the numbers of qualified instructors who have to teach in Malay. Many of the University staff are non-Malay and many have received their advanced education abroad. Even the Malay or non-Malay teachers and students conversant in the everyday use of the Malay language will find it exceedingly difficult to couch scientific and academic subject-matter into the Malay language, which until recently was not utilized in such a context.

IV. DESCRIPTIVE ANALYSIS OF THE EDUCATIONAL SYSTEM YIELDING THE ASPIRANTS TO HIGHER EDUCATION

A. The Present School-System

No analysis of any aspect of higher education can ignore the effects of the preceding levels of schooling. In fact many of the conditions and attitudes hypothesized to have an effect on the channeling process, have their origin in the educational process. No attempt has been made here to explore how far the main variables of the channeling process are conditioned by prior schooling. This constitutes a research task in itself and requires a different focus. Nevertheless, it is important to point out some of the features of the schooling process in general and secondary schooling in particular.

1. Structure of Primary and Secondary Schooling

In January 1965, the school-system was reformed with the introduction of Comprehensive Secondary Education:

....its aim is the need to provide equal educational opportunity and the intention of gearing education to meet the growing manpower requirements of our expanding industries and economy.¹

¹Radio broadcast on December 12, 1964, by Enche Aminuddin bin Baki, Chief Education Advisor on Comprehensive Education.

More specifically this meant that:

- (a) the orientation of academic subjects was diversified with a range of vocational subjects, in order to provide educational opportunities for pupils who were not as academically inclined. The broader-based curriculum was designed to enable pupils to discover their real interest, aptitudes and skills;
- (b) different streams with specialized curriculum-content were provided within the framework of the regular secondary schools;
- (c) the Secondary School Entrance Examination was abolished and all pupils could attain education on the secondary level to complete a total of nine years.

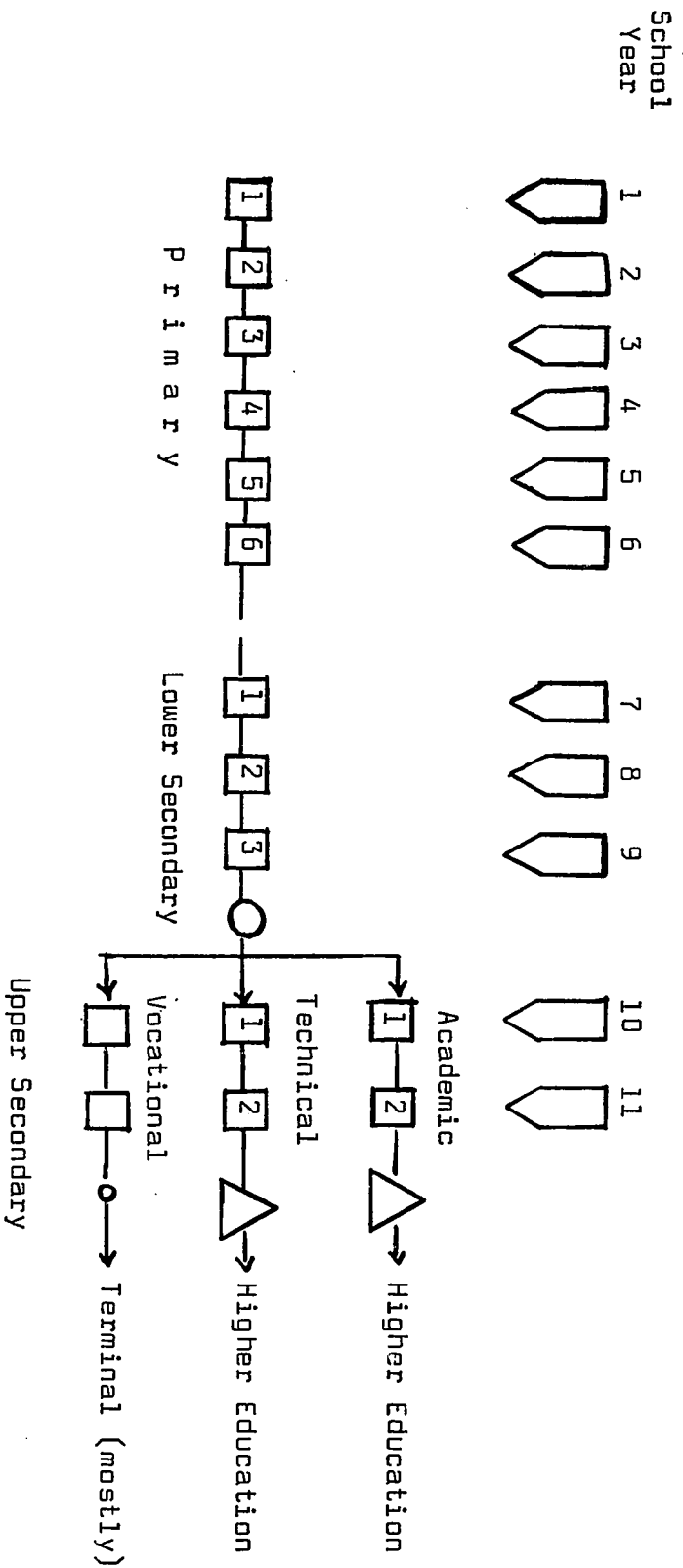
During the sixth and ninth school year, the curriculum of the comprehensive schooling consists of core subjects and elective subjects, which pupils choose according to their interest and aptitude, assisted by a system of educational guidance.

At the end of the three years of comprehensive education, pupils take the Lower Certificate of Education Examination, the results of which serve as a basis for an assessment of a pupil's ability and performance. Those who qualify in the appropriate subjects can proceed to the upper secondary schools in either one of the specialized curricula with an academic, technical or agricultural emphasis. After proceeding through the Lower and Upper Sixth Forms, pupils take the Malaysian Certificate of Education Examination, the results of which can qualify them for entry into the University. The structure of the school system is outlined in CHART 2.

2. The Institutions of the Primary and Secondary Schools

Even though much more detail should be supplied to adequately describe the school system and its workings, the

CHART 2: THE EDUCATIONAL SYSTEM OF MALAYSIA INCLUDING
SECONDARY SCHOOL LEVEL



- LCE Examination
- △ MCE Examination
- MCVE Examination

Source: Educational Statistics of Malaysia, 1938 - 67
(Ministry of Education, Educational Planning and
Research Division, Dewan Bahasa Dan Pustaka, 1968)

focus in this study centers only on the aspects that may have a direct bearing on the characteristics of the student-intake of the University.

The ingredients of the educational process can be categorized as: physical facilities, financial allocations, manpower and skills, curriculum content, and methods of teaching and learning. It is somewhat difficult to assess the output, other than by enumerating the graduates and their examination results in standardized tests. These measures are probably not more than very first approximations of the real worth of the school-leavers in terms of initiative, creativity, capacity for self-improvement, leadership capabilities and ability to apply knowledge.

a. Physical Facilities.

According to a report prepared by the Ministry of Education in 1968,² there were:

4,619 Primary Schools of the Four Media of instruction: (2,324 Malay, 1,116 Chinese, 693 Tamil, 486 English)

and

841 Secondary Schools: (256 Malay, 37 Chinese, 515 English, 33 Vocational)

The physical standards of operation of a school and its enrollment per classroom are established by the Ministry of Education.³ It is not surprising that adherence to these prescribed standards

²Education in Malaysia, Ministry of Education, EPRD, 1968.

³Ibid., p. 24.

cannot be enforced to the letter of the law. Variations in the adequacy of facilities and supplies are suspected between the rural and urban schools, and between the English-medium and Malay-medium schools.

According to a sample survey of secondary schools,⁴ inequalities were found between the English-medium and Malay-medium schools as is shown in TABLE 3. The full implementation of comprehensive education was, and still is, hampered by the shortage of facilities such as workshops, laboratories and proper equipment. This is recognized and,

TABLE 3: COMPARISON OF SOME PHYSICAL FACILITIES IN ENGLISH-MEDIUM AND MALAY-MEDIUM SECONDARY SCHOOLS

Criteria	English-Medium	Malay-Medium
No Science Laboratories Available	2%	3%
Only One General Science Laboratory Available	15%	40%
More Than One General Science Laboratory Available	39%	43%
2 Or More Laboratories Available	42%	14%
Science Laboratories Well-Equipped	50%	26%
School Library Available	94%	94%
Fully Adequate Physical Facilities Of Library	11%	0%
Supply Of Books Fully Adequate	11%	3%
Functional Design Of School-Building Exceptionally Well-Suited For The Time Being	87%	94%
Source: EPRD Secondary School Survey, 1971		

⁴Preliminary Report on EPRD's Secondary School Survey, conducted by Harold Beebout from the University of Michigan, under the auspices of the EPRD, preliminary tabulations made available, May 1971.

....an impressive program is under implementation to supply science equipment and workshop facilities; in the years 66-68 there were built and equipped in secondary schools: 265 science laboratories, and 108 workshops.⁵

b. Financial Allocations.

The costs of education, capital as well as current are almost exclusively financed from public revenues. Only approximately 5 percent of the total costs are met by charges to parents. During the last 12 years, the proportion of the GNP devoted to education has almost doubled.⁶ The bulk of educational expenditures is channeled into primary education, despite the tremendous growth of secondary level education. The statistics for distribution of recurrent expenditure by level and type of education in 1967 compiled by the UNESCO Mission are shown in TABLE 4.

TABLE 4: PERCENTAGE DISTRIBUTION OF EDUCATIONAL EXPENDITURE AMONG LEVELS AND TYPES OF EDUCATION (1967)

Primary Education	51.7
Lower Secondary Education	15.9
Upper Secondary	3.5
Form VI Level	0.5
Hostel And Other	2.2
Teacher Training	9.1
University of Malaya	4.4
Vocational Education And Cost of Administration	12.7

Source: UNESCO Mission Estimates

⁵UNESCO, Vol. II, op. cit., p. 30.

⁶Educational Statistics of Malaysia, 1938-67, op. cit.

Statistics referring to the years 1969-70 indicate a relative increase in expenditure for higher education, reaching 8.8 per-cent of the GNP.

The educational budget is included in the national budget. The treasury controls the major changes of requirements of funds between allocations and expenditures over and above the budgeted estimates. Capital items have to be submitted and approved by the National Planning and Development Council within the Prime Minister's Department. After approval their disbursement is then controlled directly by the Minister of Education. The normal operating costs are allocated to individual schools through formulae based on previous budgets and enrollment. Applying the formula to determine the school's financial support leads to maintaining the existing situation and perpetuating imbalances in the physical and manpower inputs of the different schools. Through the headmasters of individual schools and the State Chief Education Officer, the Ministry is informed of the specific shortages of personnel, materials, equipment of each school. The sample survey of secondary schools, summarized its preliminary findings on costs as follows:

....that the total per-pupil expenditure in upper secondary schools varies greatly, with expenditure in some schools being almost double that in others.⁷

The survey found smaller class sizes and higher percentages of graduate teachers to be the main causes for higher per-pupil cost.

⁷Preliminary Report on ERPD's Secondary School Survey, op. cit., p. 13.

Administrative and other non-teaching cost components were shown to be subject to significant economies of scale, rendering schools with enrollment in the range of 1,000 to 1,350, the most economical.

c. Manpower and Skills.

The teacher-to-class ratio is prescribed as 1.2 teachers per class on the primary level, and 1.6 per class on the Form VI level. Teachers at the primary level are mainly graduates of the Day Training Centers or Colleges. In the lower secondary classes teachers who have qualified at the various Malayan Teacher Training Colleges instruct pupils. It is easily understandable that the prescribed ratios in terms of numbers of teachers cannot be rigidly enforced in all schools at all times and even less so, when the qualifications of teachers are taken into consideration.

The qualifications of teachers, seem to be of strategic importance. In the preliminary findings of the above cited survey it was found that teacher qualifications were more significantly related to examination performance than student/teacher ratios.⁸ Inputs of higher teacher qualifications are positively correlated with better than average performance in terms of examination results. Therefore, it is likely that those schools receiving higher financial allocations for their recurring expenditures are also schools which have already attracted a

⁸Preliminary Report on EPRD's Secondary School Survey, op. cit., p. 12.

higher percentage of graduate teachers and, therefore, are more effective in their teaching.

It is suspected that teacher qualifications, especially in science, mathematics, and technological subjects vary greatly from school to school. At the same time, there may be a pattern in these variations, namely that the Malay-medium schools and the English-medium schools are differently affected and that the urban schools and the rural schools are also differently endowed with teaching skills. It is also suspected that teachers able to teach in the Malay language avoid being trained in the scientific fields. In addition, highly qualified teachers and particularly the much sought after science teachers cluster in the larger urban centers. The following observations contain some of the evidence.

In 1959-60 approximately 35 percent of the primary school teachers were untrained.⁹ Many of the primary school teachers were recruited at a time when science was not a compulsory subject. While the teaching force had expanded greatly, the proportion of untrained teachers was still very much the same in 1968.¹⁰ The situation is slightly better in the secondary schools where, in 1962, only one out of every four teachers was untrained.¹¹ Inevitably some dilution of

⁹Pires, E.A., Primary Teacher Training in Asia, Bangkok: UNESCO, 1963, p. 239.

¹⁰Miller, W.W.G., (ed.), Education in South East Asia, Sydney: Novak, 1968, p. 184.

¹¹Wang, G., Malaysia: A Survey, London: Pall Mall, 1964, p. 207.

the quality of training has accompanied the rapid expansion of schools and teacher colleges during the past decade.¹²

A sample survey of upper secondary schools in 1971 indicated that only 25 percent of form IV and V teachers were graduates. Disaggregated, the percentages of teachers with degrees were 13 percent for Malay-medium versus 33 percent in English-medium schools.¹³ The percentages of science and mathematics teachers with graduate qualifications were 8 percent in Malay-medium schools and 43 percent in English-medium schools. In the same survey it became apparent that English-medium schools with higher than average percentage of graduate teachers tended to produce students who performed better than average.¹⁴ Cross tabulations of the percentage of the graduate teachers in Forms IV and V and the type and size of school revealed that there were fewer graduate teachers in small schools, in rural schools and in the Malay-medium schools.¹⁵ Likewise, the survey revealed that small schools and rural schools tended to be associated with fewer graduate science teachers. Malay-medium schools compared to the English-medium schools also had a much smaller percentage of graduate science teachers.¹⁶

Besides the methodological skills and substantive

¹²Miller, W.W.G., (ed.), op. cit., p. 184.

¹³Preliminary Report on ERPD's Secondary School Survey, op. cit., p. 24.

¹⁴Ibid. p. 14.

¹⁵Ibid. p. 36, Table 1.

¹⁶Preliminary Report on ERPD's Secondary School Survey, op. cit., p. 39, Table 2.

knowledge of the teachers, an important input is the morale and dedication with which teachers go about discharging their task. Two factors have a negative influence:

- (a) teachers are underpaid, thus the teaching professions cannot compete with other private or government employment;
- (b) the social status of teachers is comparatively low.

Considering these two negative factors affecting morale and dedication, it is not surprising that the entire teaching profession is not necessarily dedicated and inspired to go beyond the formal call of duty. The only quantitative evidence in this area of difficult judgement is data from the ERPD sample survey. The sample survey of 89 schools undertook to elicit judgement on teachers' motivation.¹⁷ Teaching staff was judged on a scale ranging from "well-motivated, enthusiastic and giving their best" to "doing as little as possible". In 6.7 percent of the schools teachers were judged to be generally highly motivated; 60 percent took second place on the scale; a significant portion--30.3 percent--were judged to be in the middle position and 4 percent took the fourth position. The figures for the Malay-medium and the English-medium schools were very similar. These figures are most likely based on very superficial and even biased judgement by the headmasters and have to be considered with great caution. On the other hand, one could carefully attach some significance to the fact that one-third of the teachers were judged to perform far from

¹⁷Ibid., p. 23.

"giving their best".

d. Curriculum Content.

Standardized curricula for schools at all levels are established by the Ministry of Education. The Ministry also prescribes a schedule for the allocation of time between the different subjects. This regulation of content of the learning process is deemed necessary because all pupils are subject to standardized examinations.

CHART 3 is included to show graphically the time devoted to the different subject-areas. The prescribed time allocation for science and mathematics does not appear to be out of balance in the science-stream. The same observation can be made by examining the detailed curriculum for Forms IV, V and VI in TABLE 5. It should be noted that science and mathematic subjects are excluded in the arts-stream of the Upper Form VI level.

The unbalanced emphasis between science and humanities throughout the educational system, however, is not so much a problem of prescribed curriculum content as of failing inputs and a problem of disproportionate numbers of students. The proportion of students concentrating mainly in the sciences, i.e., taking two or more science subjects, remains at 30 percent, whereby the long-term objectives of educational planners is a ratio of 60 percent science to 40 percent arts. Another indicator is the percentage of pupils in all streams, taking at least one science subject. This proportion has dropped slightly

CHART 3: TIME DEVOTED TO STUDIES BY LEVEL AND STREAM PERCENTAGE

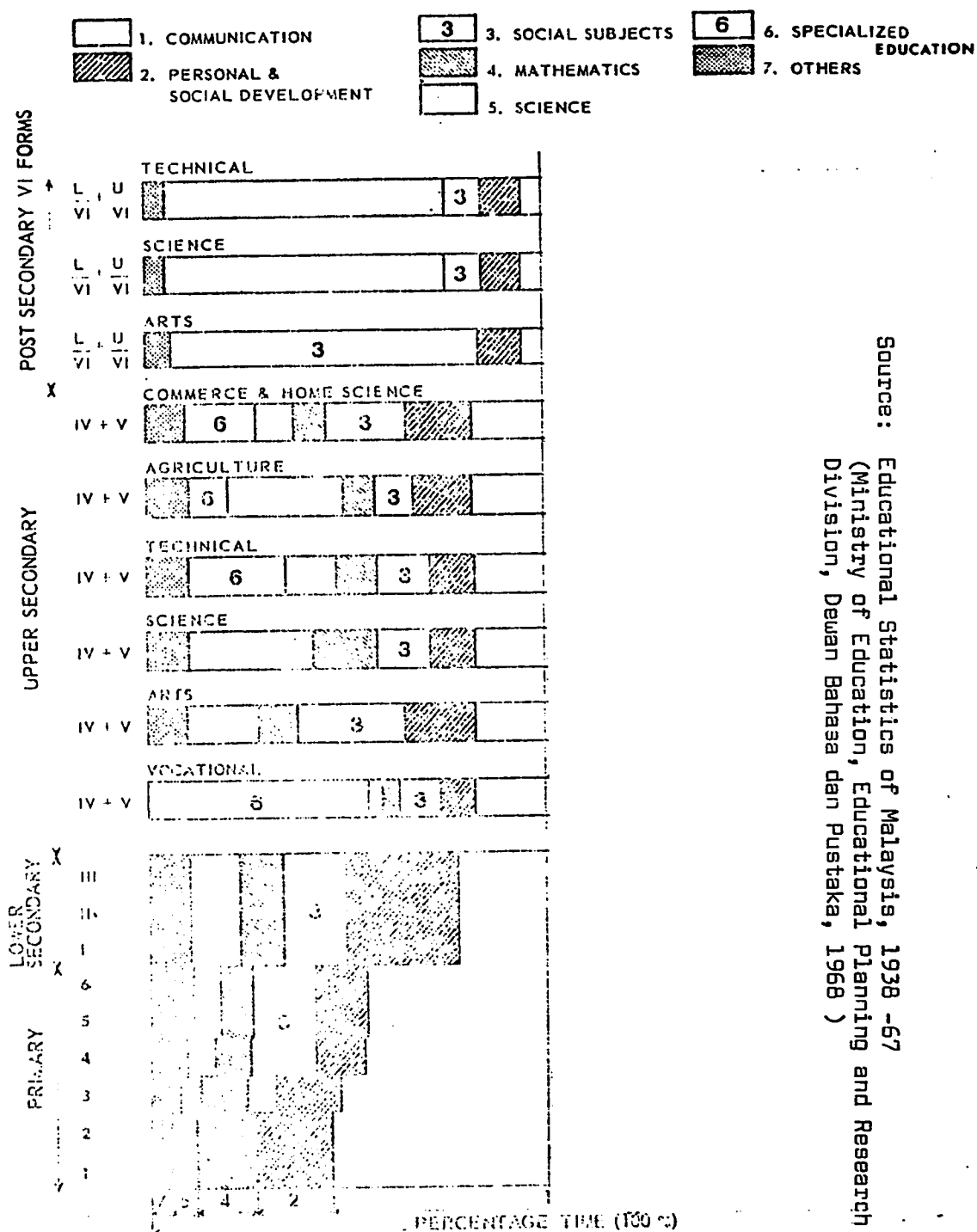


TABLE 5: SECONDARY SCHOOL CURRICULA: (PRESCRIBED SUBJECTS IN NUMBERS OF MINUTES PER WEEK)

Secondary School (Form IV-V)			
Subjects	Arts	Science	Technical
Language Medium of School	200	200	2 00
Islamic Religious Knowledge ³ /Pupil's Own Language ²	120	120	120
National Language/English Language Literature/Any other subject approved by the Registrar	160	160	160
Mathematics	120	-	-
Additional Mathematics	200	160	200
General Science	(160) ¹	160	(160) ¹
Additional General Science	200	(200) ²	-
Physics	160	(160) ²	-
Chemistry	-	200	120
Biology	-	200	120
Art and Crafts and/or Music	80	80	80
Physical Education	80	80	80
Civics	40	40	40
Social Studies/Geography/History	-	120	120
Geography	120	-	-
History	120	-	-
Two of the following:-			
(i) Geometrical and Building Drawing/Geometrical and Mechanical Drawing	-	-	120
(ii) Engineering Science	-	-	120
Surveying/Additional Mathematics	-	-	120
Engineering Workshop Practice/Building Construction	-	-	120
Agricultural Science	-	-	-
Commerce	-	-	-
Principles of Accounts	-	-	-
At least two of the following:-			
(i) Cookery	-	-	-
(ii) Needlework & Dressmaking	-	-	-
(iii) General Housecraft	-	-	-
(iv) At the discretion of the head teacher ⁴ (excluding Group Activities)	160	-	-
Group Activities ⁵	180	140	140
Total Minimum Number of Minutes Per Week	1780	1780	1780

Secondary School (Form VI)			
Subjects	Arts	Science	Technical
National Language ⁹ /English Language ¹⁰	80	80	80
General Studies	160	160	160
Malay	11	1280	-
English			
Geography			
History			
Art			
Economics			
Mathematics			
Any other subject approved by the Registrar			
Physics	12	1280	1280
Chemistry			
Biology			
Mathematics			
Pure Mathematics			
Applied Mathematics			
Technical Drawing			
Any other subject approved by the Registrar			
At the discretion of the Head Teacher ⁴ (Excluding Group Activities)	80	80	80
Group Activities ⁵	180	180	180
Total Minimum Number of Minutes Per Week	1780	1780	1780

Source: Educational Statistics of Malaysia 1938-67, Ministry of Education, Educational Planning and Research Division, Dewan Bahasa dan Pustaka, 1968.

from 52.7 percent in 1966, to 51.3 percent in 1969.¹⁸

The problem of the weak scientific-mathematical orientation presents itself in two aspects:

- (a) students who opt for a concentration in the humanities can largely avoid science and mathematical subjects. This situation is reflected in that 48.7 percent of all pupils in the upper secondary levels do not take any science subjects. This might be partly due to the students' own choosing, but it is also partly due to circumstances of earlier neglect or ineffective teaching of the science subjects and the resulting unpreparedness of students;
- (b) only 30 percent of pupils on the upper secondary levels opt for a concentration in the mathematical-scientific subjects. It must be expected that the intensity and effectiveness of science-teaching is rather unevenly distributed among schools, and that a number of pupils are thus disadvantaged in the nationwide, standardized examinations.

It can be anticipated that different schools and different classes will fulfill the norms of the prescribed curriculum to a varying extent. Also, there is quantitative evidence of an acute and persisting shortage of qualified teachers in subjects of scientific and technological content. Even if the norms in terms of hours can be fulfilled, this often implies that much of the teaching is by underqualified teachers.

The shortage of teachers is only one link in the chain of socio-cultural causation. Without trying to explain the cultural reasons, we shall accept two observations commonly made, namely:

...that most Malay students had an aversion for anything that dealt with numbers. Since Mathematics is the basis of all science learning, a

¹⁸UNESCO, Vol. II, op. cit., p. 4.

poor background in it meant, that the student would not be able to do well in science.¹⁹

....that the multi-lingual nature of Malaysia imposes difficulties with education. Language study takes up a large slice of the child's school time, thus restricting study of other subjects which could well be more useful from the point of view of both personal and national development. It also reinforces the traditional concept of education as a verbal, bookish, academic matter.²⁰

e. Methods of Teaching and Learning.

Teaching methods, and indeed, the goals of school education have undergone great changes all over the world during the past decades. Teaching today is directed towards the cognitive domains of knowledge; in other words, the ability to apply. In more conventional education accumulation of knowledge is overwhelmingly important; while the other aspects are only expected in advanced stages of intellectual maturity.

If accumulation of knowledge is the overriding goal, then the methods of learning rely on the mechanistic capabilities of the human intellect, such as: memorizing, storage, and recollection.

Great strides are being made in modernizing the methods in Malaysia's schools, but as is obvious, such transformations require time and thus it is to be expected that teaching and learning methods in Malaysia still tend towards the bookish, mechanistic acquiring of factual knowledge at the expense of

¹⁹Prof. Ungku Aziz, Vice-Chancellor of the University of Malaya, on "Science Education," in: Malay Mail, Friday, May 28, 1971.

²⁰Miller, Education in South East Asia, op. cit., p. 183.

bring the other mental faculties into play. Consequently, teachers approach their pupils almost exclusively through textbooks and there is little time and scope for independent thought and problem-solving. Some of the major deficiencies of pupils which persist during their university studies can be summarized as follows:²¹

- (a) pupils are preoccupied with merely factual knowledge and not able to organize facts into frameworks and proper perspective;
- (b) pupils are often satisfied with being able to recount the facts; and have little desire to understand the why and how of these facts;
- (c) there is very little emphasis on the ability to relate, categorize and generalize; and very little power of abstraction;
- (d) there is very little training in logical methods of argument and research, and therefore, pupils feel insecure and shun independent intellectual work;
- (e) pupils shun systematic, logical analysis and synthesis of unfamiliar phenomena;
- (f) in applying bits of factual knowledge to different situations pupils are very insecure or incapable.

f. Examinations.

The relative one-sidedness of the educational process towards acquiring factual knowledge is reinforced by the examination system. This leads to the distinct disadvantage that almost the entire schooling effort is geared toward equipping the pupil with the prescribed substantive knowledge that

²¹Categorized impressions gained from the researcher's experience and interviews with educators at the University of Malaya.

enables him to recollect the correct facts at the right time, i.e., during examinations.

Examinations and the traditional reverence for academic studies still cast deep shadows over the educational scene.²²

According to a newspaper comment, not only pupils and teachers, but also parents and society are biased in favor of "academic" education, and much attention is paid to the "important" (academic) subjects to get children through the examination.²³

However, there is justification for the present standardized examination system in Malaysia. Centralized control through standardized examinations permits enforcement of the prescribed curriculum and syllabus. The safeguarding of a common curriculum is a means to make schooling relevant to developing a national identity. It further permits surveillance of the performance of individual schools. It also serves as a preventive measure against favoritism and fraud.

²²Miller, W.W.G., (ed.), op. cit., p. 191.

²³Straits Times, Editorial, July 18, 1966.

V. EVALUATION OF HIGHER EDUCATION'S CAPACITY AND OUTPUT IN VIEW OF MANPOWER AND SKILL REQUIREMENTS

The massive efforts in education, undertaken since independence resulted in the educational improvement of the employed labor force as reflected in TABLE 6.

TABLE 6: PERCENTAGE DISTRIBUTION OF
EMPLOYMENT BY EDUCATIONAL ATTAINMENT

	1962	1957
No Formal Education	43.1	26.6
Primary Education	44.3	57.1
Lower Secondary Education	7.8	10.7
Upper Secondary Education	3.8	3.0
Teacher, Technical And University Education	1.0	1.8

Source: Malaysia Socio-Economic Survey, 1967-68

Within the period 1962-67 a significant decline took place in the part of the labor force which had no formal education. Those with primary and lower secondary education account for, by far, the largest share of the increase in educational attainment of the employed. This is consistent with Malaysia's educational strategy to achieve universal education on the lower level. On the other hand, only an extremely small proportion of the employed labor force attained higher education. Under two percent

is small compared with international standards.¹

It is not possible to trace whether educational attainment had an effect on increasing employment; to what degree educational attainment was responsible for the displacement of the uneducated out of existing jobs; or how many of the educated were absorbed into additional and new kinds of jobs in the course of growth and development of the economy. It seems that little unemployment existed in the 40-65 age group, which suggests that there was no significant displacement.² There are many unresearched aspects of the effects of education on employment.

Whatever the underlying trends, there is some evidence that the increase in overall educational attainment did not reduce the proportion of educated individuals who were unemployed. The incidence of unemployment in the 15-24 age group was reported to be more than 20 percent in urban areas and about 10 percent in rural areas.³ In 1962 the proportion of the unemployed with secondary education was 25 percent. In 1967 it had increased to 34 percent of total unemployment. The rising proportion is explained by two factors. The 15-24 year-olds age group has increased relatively and there is more widespread provision of educational opportunities. When the

¹UNESCO, World Survey of Education, Paris: 1961, p. 6.

²Ibid., p. 7.

³Ibid.

unemployment of youth is compared with the overall unemployment rate of 6.9 percent (for 1967-1968),⁴ unemployment seems to be to a large extent a youth problem.⁵

In fact the Government recently became acutely aware of the emerging social-economic problem of unemployed youth. When the trends are put into relation, the following picture emerges:

- (a) there was a considerable increase of educational attainment (primary and lower secondary levels) among the employed;
- (b) not all the educated can be easily employed. The proportion of educated individuals who were unemployed and specifically unemployed youth has increased considerably;
- (c) only a small proportion of the employed attained higher education (upper secondary and university levels) and these found employment easily.

At this point, reference is made to the overriding hypothesis of this study: that the many more people wanting and getting more education in Malaysia do not necessarily want the kind of education that under the circumstances of development is most likely to serve both their own best interest in finding employment and the best interests of national development. Further, it could be implied that education as presently supplied does not lead to a better disposition of employment or

⁴Ibid., p. 6.

⁵Actual unemployment is likely to be higher due to unregistered unemployment.

self-employment. The fact that all university-educated job seekers found employment relatively easily is not necessarily a proof that higher education is exempt from the misallocations, but may be attributed solely to the high status that university education enjoys. These are bold assumptions for which no attempt of proof is offered here. Nevertheless, they will provide the ground for further explorations. It is interesting to note that the UNESCO Mission supplies some supportive evidence in stating that:

The system of education, as it currently functions, practically ignores the fact that at some point in the future students have to earn a living....if the system of education is to prepare students for some kind of work, then it is necessary in the first place to reconsider what is being taught....⁶ Employers report widespread under-qualification of the existing manpower.⁷

Approaching the problem from the demand side does not lead to very clear-cut quantitative measurement but again can only be indicative of trends. Existing manpower plans fail to disaggregate their estimates with regard to occupational structure.⁸ Such estimates would constitute a point of departure for translating manpower demands into required educational output by field of study. In view of the lack of such detailed

⁶UNESCO, World Survey of Education, op. cit., p. 1.

⁷Ibid., p. 2.

⁸UNESCO, Mission Estimates, op. cit., p. 11.

data, only crude forecasts of future occupational distributions have been made by the UNESCO Mission. The latest comprehensive statistics, referring to 1965, indicate that there were significant numbers of registered vacancies requiring qualifications of higher education. For instance, many specialists had to be recruited from abroad. The vacancy rate for professional positions was as high as 10 percent of the employment in the five categories shown in TABLE 7.

TABLE 7: REQUIREMENTS FOR HIGHLY QUALIFIED
MANPOWER, 1965

Occupation	Employment	Vacancies	Expatriate and underqualified manpower for replacement
Managers	5,144	116	1,097
Technologists	3,304	346	808
Teachers with Higher Education	2,975	923	671
Other Professionals	1,751	180	649
Junior Executives	6,784	230	478

Source: EPU and UNESCO

Forecasts made by the Manpower Survey 1965, and based on extrapolating the existing proportions of high-level manpower have recently been replaced by the UNESCO Mission's estimates based on increasing proportions of various levels of skilled manpower. Until 1975 an annual increase of 2,120 professionals will be required in 10 economic sectors as shown in TABLE 8.

TABLE 8: ESTIMATES OF ANNUAL REQUIREMENTS
FOR PROFESSIONALS

Economic Activity	1971 - 75			1975 - 80		
	Annual Requirements	% to be trained	no. to be trained	Annual Requirements (max. hypn. of econ. dev.)	% to be trained	no. to be trained
1	1	2	3	4	5	6
Small-Scale Agriculture	39	100%	30	50	100%	50
Large Agriculture	80	70	56	130	80%	104
Mining	40	75%	30	40	95%	72
Manufacturing	500	75%	375	770	80	616
Construction	240	75%	180	220	80	176
Utilities	110	100	110	115	100	115
Transport, Storage, Communication	70	80	56	145	90	130
Commerce	240	40	168	500	80	360
Public Administration	500	80	400	520	90	468
Services	310	25	77	410	35	143
Total	2140		1462	2940		2174

Source: EPU Mission Estimates, p. 12 Annexes

The EPU has estimated high-level manpower requirements for the period 1975-80 under a medium and a high hypothesis of economic growth and overall employment. The medium hypothesis assumes an extremely high growth rate of GDP, while the minimum hypothesis requirements for professionals could be approximately halved.

Translating manpower estimates into educational requirements is extremely hazardous, particularly so in the realm of high-level manpower. The Mission emphasizes that the figures:

....should only be considered as no more than rough indicators of the order of magnitude of the merging task in restructuring the educational system in line with the economic and manpower requirements.⁹

and that:

⁹Ibid., p. 12.

The Mission chose to base estimates of the proportions of high-level manpower on moderate assumptions compared with estimates of the Higher Education Planning Committee, 1967.

....Furthermore, conservative assumptions were made with regard to the proportion of professionals to be trained through institutions of Higher Education.

....Estimates in TABLE 8, even under intentionally conservative assumptions, show that the attainment of the projected proportions of high-level manpower will require major changes in educational strategy and shifts in educational priorities because present education-capacities are not sufficient to produce the manpower with the needed specialization.¹⁰

The most severe shortcomings of training capacities are

for:

- i. the large numbers of sub-professionals, e.g. technicians and middle-level management personnel required;
- ii. and the substantial numbers of university-trained professionals required;
- iii. and further, in view of the large numbers of skilled workers required in all sectors;

as shown in TABLE 9.

¹⁰ Ibid.

TABLE 9: ESTIMATES OF DEFICIENCIES OR
SURPLUSES OF HIGH-LEVEL MANPOWER

Occupation	Required Educational Qualifications	1975	1985	
		Deficit or Surplus	Deficit or Surplus Hypo 1	Hypo 2
<u>PROFESSIONALS</u>				
Agriculture	University Level and Post-Second- ary	+ 25	- 45	- 30
Secondary Sector		- 250	- 610	- 320
Administration and Services		- 345	- 610	- 300
<u>SUB- PROFESSIONALS</u>				
Agriculture	Post-Secondary Agricultural Technical	+ 40	- 100	- 70
Secondary Sector		- 570	- 1,700	- 1,000
Administration and Services	Commercial	- 960	- 2,240	- 1,290
<u>SKILLED WORKERS AND WHITE COLLAR WORKERS</u>				
Agriculture	Agro & Agro Business Training	- 55	- 85	- 15
Secondary Sector		- 3,860	- 10,350	- 7,110
Administration and Services	Clerical Training	- 400	- 4,450	- 2,205

Source: UNESCO Mission Estimates, p. 13, Table 7.

The estimates in TABLE 9 do not include the requirements of the teaching and medical professions. There is a current shortage of qualified teachers for the upper secondary level and especially teachers specialized in science subjects. There are 2,598 teachers with lower qualifications who are currently

involved in upper secondary level teaching.¹¹ The current stock of teachers in mathematics and the science subjects is 550 out of 2,168 graduated teachers for the secondary school level, which has an enrollment of 468,816 pupils. Due to this shortage, non-graduate teachers in science and mathematics are frequently relied upon to teach upper secondary classes.¹² Comparing this with the supply side; in 1969 the University of Malaya, the major supplier of graduate teachers, only had an enrollment of 60 in its post-graduate diploma course for science teachers. The University of Penang plans to increase its output of science teachers but at present only 21 students are enrolled in the relevant study-program.

Nevertheless, university education as a whole requires only cautious expansion in quantity, taking into account the fact that 10,000-12,000 Malaysians are studying abroad for numerous professions. In fact, the UNESCO Mission estimates that the overall output for the existing and expanding institutions of higher education and the utilization of institutions abroad will be sufficient. A major shift of emphasis is required to reflect the expected requirements for high-level expertise in the technological and scientific subjects. More specifically, this means that equalization between enrollment in the arts,

¹¹ UNESCO and The International Association of Universities, "Country Profiles," op. cit., Vol. II, p. 7.

¹² Ibid.

sciences, and engineering is required.¹³

The greatest need is for manpower at the semi-skilled and skilled worker level which requires a quantitatively and qualitatively increasing output of more diversified educational institutions on the secondary and vocational levels. Also at the university level greater diversification is required, which means in the first instance, a more balanced allocation of students between the various fields of study. The two aspects are linked insofar as a more diversified and improved secondary educational level will result in more balanced demand for all fields of studies and more equal numbers of qualified applicants for all fields. Also what is important in the Malaysian context is more equal demand by all ethnic segments of society.

How is this diversification to be brought about? It is argued here that the required changes cannot be decreed nor can they be achieved by simply supplying physical facilities. It will require a far more complex and intricate pattern of forces, only part of which emanate from initiatives taken by the educational system. The other part will come from the initiative and response of parents and pupils and society at large in the form of change of attitudes towards various types of work and professions, incentive systems, and employment practices. Educational planners and policy-makers in general have many points for leverage which must be employed in a consistent and coherent strategy. With the following analysis of the channeling

¹³UNESCO, World Survey of Education, op. cit., p. 16.

of students into the various fields of study, it is hoped that some areas in which changes can be affected will be pinpointed.

VI. RESEARCH DESIGN AND PRIMARY DATA COLLECTION FOR THE ANALYSIS OF THE MAIN VARIABLES

Singling out a group of variables and assuming their relative importance in the process of channeling students to various fields of study is based on the rational conceptualization of empirical observations. The multitude of elements involved is thus organized into a systemic framework. The main elements can be interpreted as independent variables bearing upon the allocation of students among the fields of study. The resulting distribution of students into the various fields of study constitutes the dependent variable.

Given the widely differing nature of the variables and the low level of measurement that can be expected from some of the data, no single technique is available to quantify the relationships. The relationships also cannot be ordered into a correlational matrix and be reduced to the underlying structure of salient interrelationships through factor analysis. Factor analysis, which would require rank-order correlation-coefficients as the minimum quantifiable inputs cannot be applied because even this modest level of measurement was not attainable for most of the data. Besides, the results of factor analysis would still leave us without the explanation of why some variables are more important than others. Their nature, direction and intensity would still have to be explained.

Because the five main variables of the channeling process are based on empirical observation, the ensuing generalization is essentially a process of inductive reasoning. Although at least some of the aspects of the channeling process are reasonably well-researched, e.g. the market-influence on the choice of field of study, very little of the research can be considered to be anchored in the body of theory. Thus, the conceptualization of the elements in the systemic framework is to a lesser extent a result of deductive reasoning.

A. Framework of Research Hypotheses

The set of main hypotheses listed in Chapter II was intended to project the line of thought of the study. The following set of sub-hypotheses or research hypotheses was designed to relate more directly to the empirical evidence sought.

Possibly the greatest weakness of the study and at the same time the greatest boldness, is found in determining that certain variables should be represented, assessed and measured by the kind of evidence specified in the research hypotheses. As there are very few precedents and fewer conventions on how a multitude of very different aspects manifest itself in the distribution of the aspirants to higher education over various fields of study, the researcher was able to infer, conceptualize and suggest what factual evidence he deemed appropriate.

1. Hypotheses With Regard to Market-Influence

MAIN HYPOTHESIS:

Under the present circumstances in Malaysia, the market for university trained expertise does not exert a significant influence on the aspirants to higher education.

The relevant observations on the manpower and skill situation and the educational process were elaborated upon in Chapters III and V.

RESEARCH HYPOTHESIS:

- (1) Students' assessments of earnings in a significant number of cases are incorrect.
- (2) Accuracy of information on earnings is related to the source of information.
- (3) Information about employment opportunities in a significant number of cases is incorrect.
- (4) Accuracy of information on employment is related to the source of information.
- (5) Individuals' choices of careers in a significant number of cases are not related to assessments of earnings or of employment opportunities.

2. Hypotheses With Regard to Market-Influence

MAIN HYPOTHESIS:

Socially and culturally determined status and achievement-orientation exert significant influence on the decisions regarding fields of study and careers.

The background for the hypotheses on socio-cultural aspects is found primarily in Chapters IV and VIII.

RESEARCH HYPOTHESES:

- (1) Higher status-origin enables an aspirant to choose from the "more difficult" fields of study, due to better educational preparation.
- (2) High status-origin is related to stronger motivation to advance through education.
- (3) Achievement-orientation is unevenly distributed among the students admitted to the various fields of study.
- (4) Bias against certain activities has an effect on the choice of field of study.

3. Hypotheses With Regard to Secondary Education

MAIN HYPOTHESIS:

The limited choice at the time of entry into higher education is perceived as a restriction by a significant number of applicants and the unpreparedness of students in critical areas of knowledge acts as a restricting factor.

The pattern and content of secondary education and its effects on the aspirants to higher education was dealt with in Chapter IV.

RESEARCH HYPOTHESES:

- (1) Incidence of perceived choice restriction associated with streaming in secondary education is significant.
- (2) Restrictive decision factors were consequential for a significant number of new entrants who were dissatisfied with their streaming.
- (3) Perceived unpreparedness in certain subjects is a significant restrictive channeling factor.

4. Hypotheses With Regard to Administrative Incentives and Controls

MAIN HYPOTHESIS:

Administrative incentives and controls are not significantly effective in channeling students into the undersupplied fields of study.

Specific reference to the administrative measures involved are made in the context of Chapter VIII.

RESEARCH HYPOTHESES:

- (1) No significant re-allocation of applicants is affected between the faculties.
- (2) Scholarships have no significant effect on the allocation of students among fields of study.
- (3) Counseling and availability of information has no significant effect on the channeling of students into the different faculties.

5. Hypotheses With Regard to University-Influence

MAIN HYPOTHESIS:

The University does not effectively influence the aspirants to higher education as to their choice of field of study.

Some background information on the University's influence upon the educational process preceding it is contained in Chapter VIII.

RESEARCH HYPOTHESES:

- (1) Information on the University's educational structure and processes is not widespread and in a significant number of cases, it is inaccurate.
- (2) The University has not been effective in countering the perception of the degree of difficulty of the various study programs and its effects upon the pattern of applications and admissions.

B. Data Collection Through Questionnaire¹

Information was sought from all new students entering the University of Malaya for the academic year, 1971/72 by means of a questionnaire. This approach to the collection of data was made possible through the interest and active involvement of the University Administration. The questionnaire was mailed to the home addresses of all newly-admitted students before the beginning of the term and was to be returned to the Registrar's Office by way of a return envelope. Thus, the questionnaire was incorporated into the registration formalities. It was assumed that the newly-admitted student was eager to satisfy all administrative requirements and thus at least a good number would respond to the questionnaire. On the other hand, previous surveys from research conducted by the Faculty of Education resulted in very disappointing returns and some forecasts on the returns were pessimistic. It was thought to be advantageous to let the respondents remain anonymous at the expense of forsaking direct control and follow-up with the individual respondent. The eventual large return of 64 percent was somewhat of a surprise and provided a very large sample.

Another rather startling discovery was that the number of respondents who answered the questionnaire only partially, was

¹The complete Questionnaire is attached as APPENDIX A.

surprisingly small. Only 23 questionnaires had to be excluded because just a few selected questions were answered. In the remaining 2,005 questionnaires there were a sprinkling of incompletely answered questions which were considered insignificant as to be ignored. Whether this large return and the painstaking response by each respondent to a rather long and involved questionnaire can be attributed to the fact that the respondents were interested in the questionnaire; whether their recent admission motivated them to cooperate; or whether the formal link-up with the registration procedure compelled a large number of them; can only be subject to speculation. As Trow² indicates:

Students in the schools and colleges are the 'ideal' population for polling-- a convenient, captive, compliant, literate population, used to taking tests and answering questions.

More difficulties were encountered in the context of formulating the questions and communicating their meanings. Each question was designed to obtain data that could be used to prove or disprove the various hypotheses. This will be elaborated upon in the context of each research hypothesis. Considerations were made with regard to availability, measurability and relevance, and the final formulation of the questions were necessarily compromises. References is made to the literature of similar

²M, Trow, "Survey Research in Education," in C. Glock (ed.) Survey Research in the Social Sciences, New York: Russell Sage Foundation, 1967, p. 318.

studies, but access to such material was extremely limited in Malaysia where the research design was formulated. Thus, the theoretical linkages between the hypotheses and the kind of data presented in many cases rested on the researcher's own conceptualization.

The researcher recognized the advantages if all the questions had adhered to the principle of seeking responses to factual questions rather than inquiring into opinions and attitudes. It was not possible in all instances to gear questions to objective indicators of opinions, attitudes, behavior patterns, etc. In some cases opinions had to be taken for an answer. More so, in certain situations the respondents were required to abstract, assume certain hypothetical situations and indicate preferences under such, "....if, then...." situations. Data gained in this way must be evaluated with due consideration.

The responses to many questions have to be considered in view of the fact that the conscious motives volunteered by the respondents do not necessarily reveal the subconscious social or psychological forces having caused their particular attitude or action. In other words, the respondents cannot be expected to understand or explain the reasons why they feel or act the way they do. It is therefore recognized that the survey cannot serve to explore the underlying psychological causes and effects and thus cannot answer questions as to why individuals act in a certain way.

One will often have to look for the social and psychological factors outside the awareness of the respondent, and

Falsely it is often assumed that the explanation of social behaviour is merely the sum of explanations of the behaviour of individuals.³

The actual formulation of the questions presented another formidable problem. Even more so since the researcher was an "outsider" in the social and cultural context. Extensive advice and pre-testing was needed not only from the indigenous people but also from other knowledgeable "outsiders". The disadvantages of being an "outsider" were compensated to some degree by being able to look at the situation from a detached perspective.

Several considerations entered into the conceptualization of the research design and the tools for data collection. The researcher's background research and familiarization with factual information relating to the educational institutions and processes in Malaysia serve of course as a precondition to formulating and conducting the inquiry. His familiarization with the cultural, social scene, and psychological make-up of the ethnic groups and social strata was also important. This was facilitated by the transmission of knowledge and insights from countless knowledgeable individuals, study of the language, and extensive acquaintance with the indigenous people of all social strata. The effective communication of intended meanings through

³C. Glock (ed.), Survey Research in the Social Sciences, New York: Russell Sage Foundation, 1967, p. 354.

the questions depended on extensive advice that had to be obtained at all stages. First the researcher had to formulate in his own mind precisely what was to be communicated by the questions. Then unstructured interviews were conducted and willingly given by administrators, knowledgeable foreign experts, educators, pupils and students. Second, the intended meanings of questions had to be adapted to the perceptual framework of the respondents. This was attempted through numerous meetings with individuals and small groups of students at the Faculty of Economics and Administration. Also small-scale pre-testing of draft versions of the questionnaire was conducted with students to whom the researcher had easy access through his teaching activities. A small number of enthusiastic students were extremely helpful in discussing and re-formulating the questions.

Large-scale pre-testing was carried out in a more formal way. One hundred fifty questionnaires were distributed to students at the Mara Institute of Technology and collected a few days later. The students were predominantly Malay males, but were the only sizable congregation of suitable respondents available during the University recess. On the other hand, this particular group of Mara students was suitable for the test since they had all participated in a training program concerned with preparing them for entry into university study. The students were actually very involved and concerned with the channeling process. Several modifications were made as a result of the pre-testing.

Two independent translations into the Malay language were made and a final version was agreed upon through intensive discussions. The main difficulties were to communicate the intended meaning of questions into the perceptual framework of the Malay language and to convey some concepts for which there were no ready-made and commonly understood equivalents. It was anticipated that the non-Malay students would readily and easily communicate through the English version of the questionnaire. It was interesting to note that a considerable number of Malays likewise preferred to respond to the questionnaire in English. Judging from the returns of the actual questionnaire campaign, there was only an insignificant number of respondents who did not understand the prescribed way of answering the various questions. The finalized version of the questionnaire was also submitted to the Registrar for approval.

Considerations for consistency of the responses is, of course, prevalent throughout the entire questionnaire. Possible contradictions by too many respondents would have indicated either that they did not perceive the intended meaning of the questions or that they generally responded in a thoughtless fashion. Checks for consistency were dealt with in discussions of the various hypotheses.

C. Categorization, Measurement and Statistical Methods

The questionnaire was designed to obtain nominal and ordinal data. Responses to some of the questions are of a dichotomous or multiple category allowing only classification rather than

measurement. In such cases only nominal data was obtained. Many other questions generated data which could be measured on an ordinary scale, mainly through ranking. The nature of multiple category variables, however, allow only crude gradation. All the above characteristics limit the use of statistical methods to the realm of non-parametric statistics. The statistical analysis of the data, involves the two major functions: description and inference.

Descriptive statistical procedures do no more than summarize the data to better communicate their important features. The nominal data as generated by most of the questions,⁴ lend themselves only to simple frequency distributions, summary distributions, and indication of central tendencies, to describe the salient characteristics. These were displayed in many of the tables. In addition, cross-tabulations of the values of two variables from two questions were frequently employed to study simple relationships. Only qualitative interpretations could be made due to lack of measurement for nominal data.

Numerical ordinal data were generated by some of the questions,⁵ while verbal-ordinal data resulted from only one question.⁶ Ordinal data allows a limited level of measurement in the form of ranking. Correlation between several sets of

⁴QUESTIONS 1 through 10; 13, 15, 16, 19 through 25; 27 through 37.

⁵QUESTIONS 11, 12, 17, 18, 26, 34.

⁶QUESTION 14.

ranked data were measured as for instance, on pp. 95 and 108, (Chapter VII, A), Kendall's Coefficient of Concordance.⁷ Correlation between two sets of ranked data was measured by computing Spearman's Rank Correlation Coefficient,⁸ as for example, on pp. 103 and 109, (Chapter VII, A).

Procedures of inferential statistics were involved in testing the research hypotheses in order to evaluate the risk of making generalizations from the sample data. The research hypotheses are in some cases stated in terms of expecting a difference, in other cases in terms of expecting no difference between two sets of data. In order to avoid confusion the formulation of "research hypotheses" must be clearly distinguished from the concept of a "statistical hypothesis" which has to conform to the requirements of the statistical methods of hypothesis testing. This is necessary because no matter what inferential procedures are applied, they can only be used for testing "statistical hypotheses" of no difference. The "statistical hypotheses" are not formally stated in the test, however. There is no problem of interpretation when a "research hypothesis" is based on a statement of no difference between two sets of data. However, in the cases where differences were hypothesized and the test shows no significant difference, the "statistical hypothesis" of no difference is accepted but the "research hypothesis" of difference is rejected.

⁷The explanation of statistical tests appears in APPENDIX D.

⁸Ibid.

Chi-Square analysis was employed in two contexts to indicate whether there was reason to believe that a frequency distribution differed significantly from a distribution that could occur by chance, or whether two frequency distributions were significantly different from each other (or were similar). Examples for the application of the former are the data in TABLES 13 and 14. The latter test was applied, for instance, to the data in TABLES 35 and 36.⁹

Binominal Tests¹⁰ were employed for the data on pages 164 and 165 in order to test whether the percentages of respondents fell into a range of values that could be expected in a chance distribution.

All counts and computations involved in the statistical procedures were processed by computer. The program package, "Statistical Package for the Social Sciences" was utilized for all tasks such as, frequency distributions, cross-tabulations, measures of association and tests of inferential statistics.

A complete tabulation of the data obtained through all questions appears in the Master Tabulation in APPENDIX B.

D. Coding and Classification

The coding of responses for the purpose of recording them on punch cards was technically rather simple. Nominal data,

⁹The explanation of statistical tests appears in APPENDIX D.

¹⁰Ibid.

whether dichotomous or multiple-category required only one column to record the entry categorizing each response. If the categories were not mutually exclusive, a separate column was required for each category. Ordinal data required entries into as many columns as there were categories to be ranked. The Coding Scheme is presented along with the Master Tabulation of the raw data in APPENDIX B.

In three instances classification was undertaken after the information was obtained from the respondents--a posteriori categorization. The rationale being that a more unified standard could be applied by the researcher, rather than relying on the varying judgment of a multitude of respondents. Thus, it was not deemed advantageous to submit a very detailed classification schedule to the respondents. It is recognized that the a posteriori classification may carry an element of error, especially when the information supplied by the respondents was unclear or ambiguous. This applied particularly to QUESTION 7 in which a classification of the economic standing of the respondent's family was attempted. The same was true, to a lesser extent in QUESTION 10, in which a classification of the social, community involvement of the respondent's family was sought. QUESTION 27, regarding the town in which the respondent attended upper secondary school, allowed for a rather clearcut classification. The a posteriori classification schemes are attached in APPENDIX C.

E. Validity and Representativeness of Sample

There was concern as to the representativeness and validity of the data actually obtained. With what confidence can conclusions be drawn from the sample and inferences be made that the deductions generally apply to the study population? From a "study population" of 3,150 (number of admitted students) which at the same time represented the "target population" (students to whom the questionnaire was mailed), 64 percent responded. Therefore the question as to the validity, i.e., sufficient size of the sample, can be rather safely neglected.

The question as to the representativeness, however, requires attention because the group of non-respondents is large enough to distort representativeness significantly, if the non-response is due to an underlying pattern, i.e. (deviating significantly from chance). The "study population" (admitted students) was not stratified according to any criteria, nor was the "target population" (students to whom the questionnaire was mailed), randomly selected. It is conceivable, therefore, that a biased sample was obtained if the 2,005 respondents contained disproportional representation of any one ethnic group. The reasons not to respond for part of the target population could be that either Malays or non-Malays were suspicious of the intentions in obtaining information on students in spite of the fact that they were assured of anonymity. Another reason could be that any one of the racial groups was apprehensive and generally more uncomfortable about revealing attitudes, motivation and personal background information.

A statistical test was applied to determine whether the racial proportioning of the respondents was significantly different from what could be attributed to chance. Stating the hypothesis that there was no significant difference between the proportion of Malays in the sample and the proportion of Malays among the students admitted for the academic year 1971/72, a Chi-Square Test could be administered.¹¹

	Malay %	Non-Malay %	Total Number	Test of Significance of Difference at 0.01 Level
Sample	50.7	49.2	2,005	Not Significant
Study Population	53.7	45.3	3,150	(Chi ² 0,711; D.F. 1

The results of the Chi-Square Test as shown above indicated the difference between the sample and the study population could only with 1 percent probability be attributed to reasons other than chance. The hypothesis of no difference was thus accepted.

A similar test was applied to the hypothesis that male and female students reacted differently and thus contributed to a disproportional composition of the sample. Stating the hypothesis that there was no significant difference between the proportion of males in the sample and the proportion of females in the study population, a Chi-Square Test could be applied:

¹¹The explanation of statistical tests appears in APPENDIX D.

	Male %	Female %	Total Number	Test of Significance of Difference at 0.01 level
Sample	67.8	32.2	2,005	Not Significant
Study Population	70.1	29.9	3,150	(Chi ² 0, 150, D.F. 1)

Both tests with regard to representativeness of the sample in terms of race and sex, showed that the small differences in the proportions in the sample and study population could be attributed to chance, with a confidence of 99 percent.

Thus, it will be assumed that the stratification as to race and sex in the sample is a representative reflection of the respective stratification in the study population. There could be, of course, other biases caused by other factors rendering the sample unrepresentative but in view of the large sample in relation to the study population and in view of the insignificant differences tested above, no further considerations were made.

VII. RESEARCH ON THE VARIABLES OF THE CHANNELING PROCESS

A. The Market Influence in The Channeling Process

The subject of inquiry here is whether the labor market and its classical indicators in the form of job opportunities and the scale of remuneration can be relied upon to guide the decisions of students. There is widespread contention that it cannot.

When a society decides....to use the educational system as an instrument for national development, it is beset by many novel problems. One is that while many more people want more education, they do not necessarily want the kind of education that under new circumstances is most likely to serve both their own future best interests and the best interests of national development. When the incentive structure and the employment demands of the market-place also reflect the old hierarchy of prestige, there is a serious disfunction between the nation's manpower needs and its actual manpower demands.¹

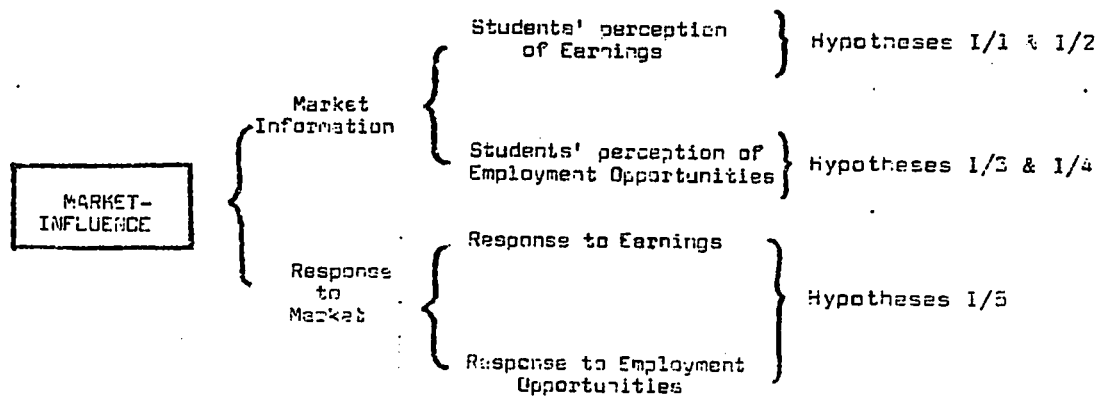
Several specific reasons appear to obstruct the market forces, especially in the case of Malaysia's society which is undergoing rapid social, cultural, and economic changes in some aspects, but at the same time is anchored in cultural traditions, preferences and social conventions.

Higher education has traditional prestige which is ascribed to a degree or title; the high prestige is not

¹Coombs, op. cit., p. 7.

necessarily connected to high earning potential as a result of scarce supply of a particular skill. Some professional training allows for a considerable degree of substitutability, meaning that the initial career goals do not have to be maintained throughout a lifetime. In societies with a shortage of highly trained manpower, a considerable share of their scarce expertise is misallocated, i.e., particular expertise is not employed where it would contribute optimally. In a developing and restructuring economy and society, it is extremely difficult for the individual pupil or his parents to predict what employment chances and earning potential can be expected several years hence, after completion of long-term schooling and study-program. The dissemination of labor-market information follows traditional channels of communication which could be susceptible to inaccuracy and distortion. Even if the information is correct, it is usually based on past experience rather than on expectations of the future. In the context of this study gauging the effect of the market on students' decisions was attempted by subsuming the multitude of possible influences under two elements: "market transparency" and "response to market".

Market transparency, specifically information on earnings, will be analyzed for its accuracy and whether its accuracy varies according to the different sources from which it was obtained. The same will be attempted for information on employment opportunities, and the respective sources of this information. The following constitutes a breakdown of the elements into researchable components.



MAIN ELEMENT	MAIN HYPOTHESES	INDICATORS	RESEARCH HYPOTHESES AND EMPIRICAL EVIDENCE
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1. Research on Market Influence, Hypotheses I/1 - I/5

a. Students' Perception of Earnings.

i. Assessment of Earnings (HYPOTHESIS I/1).

Students' assessments of earnings in a significant number of cases are incorrect.

QUESTION 12² was sought to obtain from the respondents their perspective on earnings for a number of broadly categorized professions. It was designed to obtain such information in the form of rankings. Several considerations were made with regard to gathering the information. First, the professions needed to be categorized in a way that would be easily understood, would be distinguishable and would constitute common career goals for university graduates in Malaysia. Second, it was necessary to

²QUESTION 12: Rank the following careers according to what you think are average earnings. Categories of professions are listed as in TABLE 9, p. 66.

ensure that the respondents had a clear, uniform perception of what was meant by "average earnings." Third, to communicate to the respondents how the question was to be answered by ranking according to average earnings. With regard to the first consideration, a number of knowledgeable persons were consulted about a suitable and conventionally understood categorization of professions. Interviewing and pre-testing with students yielded additional insights. Several changes had to be made.

It was expected that the concept of "average earnings" could be subject to varying interpretations. There was the possibility that respondents would refer to "earnings, averaged over the productive life-span of an individual," or that they might perceive of "potential earnings," etc., had to be safeguarded against. Through the pre-tests and follow-up interviews, it was established that almost all respondents in the pre-tests interpreted the notion of "average earnings" in the intended fashion; namely, as the "average income of all the members of a profession at a point in time." There was no need to give further instructions in the formulation of the question. In fact, it was found that more detailed explanations were likely to confuse the respondents.

Several approaches were made to explain to respondents the way in which QUESTION 12 was to be answered. Difficulties arose because the notion of "ranking" was not always readily understood. It was deemed necessary to provide rather elaborate graphical instructions for all questions involving ranking.

During the large-scale pre-testing an operational mode was found. Judging from the pattern of the responses, i.e., frequencies of rank positions, tabulated in the Master Tabulation in APPENDIX B, it can be assumed that a large majority of the students did not respond haphazardly. The clearcut pattern in the responses also indicates that the categorized professions and the concepts of "average earnings" and "ranking" were rather uniformly interpreted.

The respondents' assessments of earnings of the various professions was compared with a "reliable set of data" in order to be able to make some statement about the accuracy of the students' information. No specific statistics were available on earnings of professions as categorized in QUESTION 12. Furthermore, existing statistics were not collected on a comparable basis. It was, therefore, necessary to rely on "expert opinion" as a yardstick for comparison. It was assumed that knowledgeable persons have a readily available scale of magnitudes and proportions with regard to earnings. This was borne out in several interviews. Since only an assessment of the relative position of earnings of the professions in the form of ordinal data was to be obtained rather than more precise measurement, it appeared justifiable to rely on expert opinion (see TABLE 10).

TABLE 10: EXPERTS' RANKING OF PROFESSIONS
WITH REGARD TO AVERAGE EARNINGS

various professions	different experts					overall ranking (modes)
	A	B	C	D	E	
lawyer	5	5	2	5	5	5
engineer	4	4	4	5	4	4
higher-level govern- ment administrator	3	3	4	3	3	3
business executive	1	1	1	1	1	1
secondary-school teacher	8	7	8	8	8	8
university lecturer	6	6	6	6	6	6
medical doctor	2	2	2	3	2	2
scientist	7	8	6	7	7	7

Three experts were members of the Faculty of Economics and Adminis-
tration at the University of Malaya;
One was a foreign advisor at the Educational Planning and Research
Division of the Ministry of Education;
One was a Civil Servant in the Economic Planning Unit.

A measure for the relatively uniform judgement of experts can
be obtained in the form of Kendall's Coefficient of Concordance³
which was computed to be 0.6166.

³For the purpose of estimating interrelations among
more than two sets of data, ordinal data in this particular case--
the only available method to arrive at a single value as a mea-
sure of association is Kendall's Coefficient of Concordance.
This measure of the overall relationship between the rankings is
obtained by computing the rank-order-correlation for all possible
pairs of any two of the rankings and then computing the arith-
metic mean of all rank-order-correlation coefficients. See also
APPENDIX D.

Not all caution could be dispelled by the relatively uniform judgement of the experts. It could be that "public opinion" is still guided by the traditional valuation of professions, which may be changing and already mixed with considerations of market-forces or politically determined priorities. Due to lack of more objective data this question could not be resolved. Information on starting salaries, as listed below in TABLE 11, was the only readily available data. Starting salaries, however, are by no means representative of "average earnings" and thus the wide discrepancy in the ranking of starting salaries as compared with the expert's opinion on average earnings is not surprising.

TABLE 11: ESTIMATES OF STARTING
SALARIES OF PROFESSIONS

various professions	starting salaries M\$		ranking
lawyer	6.000 ¹⁾		8
engineer	13.024 ²⁾	10.000 ⁴⁾	2
higher-level govern- ment administrator	9.000 ³⁾		6
business executive	10.000 ⁴⁾		5
secondary-school teacher	9.000 ⁵⁾		7
university lecturer	12.000 ⁶⁾		3
medical doctor	17.094 ²⁾	13.000 ⁷⁾	1
scientist	10.584 ²⁾		4

1) Lawyers Association

2) Hoerr, O.D., Education, Incomes and Equity in Malaysia,
(unpublished paper presented at the Dubrovnik Conference
of the Development Advisory Service, Harvard University,
June 1970, p. 22)

3) according to Division I Time Scale

4) personal inquiry with several Corporations

5) according to Division I Government Teachers

6) University Pay Scale

7) according to Division I, Medical Officer

Comparison of students' ranking with that of the experts' was first attempted on an aggregate level. Students' overall ranking and the experts' overall ranking was derived from the most frequent rank positions (modes), listed in TABLE 12.

TABLE 12: COMPARING OVERALL RANKING BY STUDENTS AND EXPERTS OF AVERAGE SALARIES OF PROFESSIONS

various professions	Students' ranking (modes)	Experts' ranking (modes)
lawyer	2	5
engineer	4	4
higher-level govern- ment administrator	7	3
business executive	1	1
secondary school teacher	8	8
university lecturer	5	6
medical doctor	2	2
scientist	7	7

note: missing ranks 3 & 5 among the Students' ranking is due to ties of ranks 2 & 7.

The similarity between the rankings was measured by computing a rank-order-correlation coefficient according to Spearman's procedure.⁴ The correlation coefficient is 0.9503 indicating close positive correlation.

However, the substantial variance in the ranking by the students, apparent from the tabulation of responses to QUESTION 12, is obscured by this procedure.

⁴Computerized computation was based on the Statistical Program Package for the Social Sciences.

See also APPENDIX D.

In order to obtain a more discriminating measure of accuracy, a measurement of the association of each individual student's assessment with the experts' assessment of earnings was undertaken. Because of the high correlation on the aggregate level there must have been large numbers of respondents whose judgement was very similar to that of the experts'. It is useful to identify those respondents who did not closely conform with the experts' opinion. For this purpose, the Spearman rank-order-correlation coefficients were computed for each respondent. The respondents were then categorized according to ranges of the correlation coefficient. Through ranking, respondents were forced to judge the earnings of the various professions in comparison with each other. If an individual's ranking differed in several positions, his entire perspective differed. The measurement of association, i.e., similarity of respondents' ranking with the experts' ranking, could be cross-tabulated with several other characteristics of the respondents', such as, race and size of town in which the respondents attended upper secondary school. The purpose of such cross-tabulation was to discover possible differences in the accuracy of information and how they are related to ethnic characteristics or the urban environment. These characteristics are tabulated in TABLE 13.

TABLE 13: ACCURACY OF INFORMATION ON EARNINGS--
CROSS-TABULATED WITH RACE AND SIZE OF CITY

Spearman Rank Order Correlation Coeff. (categorized)	Total % of Respondents	Cumulative % of Respondents	Race		Size of Town *				
			Malay	Non-Malay	1	2	3	4	5
-1.00 - -0.80	0	0	0	0	0	0	0	0	0
-0.79 - -0.40	0.2	0.2	0.3	0.1	0.1	0.5	0	0	0
-0.39 - +0.40	30.8	31.0	35.0	26.6	28.9	33.7	27.2	28.4	39.2
0.41 - 0.80	51.2	82.2	50.4	51.9	50.8	50.1	55.5	54.3	49.6
0.81 - 1.00	17.8	100.0	14.3	21.3	20.2	15.7	16.2	17.3	11.2
	100.0		100.0	100.0	100.0	100.0	100.0	100.0	100.0

* over 90,000 = 1; 50,000 - 90,000 = 2; 20,000 - 50,000 = 3; 10,000 - 20,000 = 4; under 10,000 = 5;

(a) Findings. From the above data, it can be concluded that a considerable number of students did not rank average incomes comparably to the experts. If a rank correlation coefficient above + 0.80 is taken as a measure for precision of information, then 82.2 percent of the respondents do not reach this level of precision in their information on average earnings. On this basis, the data confirms HYPOTHESIS I/1,

student assessments of earnings in a significant number of cases are incorrect.

This result is not to be accepted without caution. First of all, objective information was unavailable, instead the assumption was relied upon that the experts assessed earnings more realistically than the students. As shown in TABLE 10, there was some variation in the different experts' opinion which may suggest that there is some difference of opinion as regards the "real" situation. Furthermore, when comparing the overall rankings of students and experts, significant disagreement occurred with regard to the relative

position of "lawyer" and "higher-level government administrator." This could be a result of a different frame of reference as to what kind of a lawyer and administrator was implied. It could also reflect valuation other than by monetary remuneration, i.e., the social value overshadowing the monetary factor.

It was anticipated that Malays (or non-Malays) may have varying access to information or have varying concern about earnings. The data in TABLE 13 reveals that the Malay respondents were distributed more heavily toward the less accurate information. Even though the percentages are small, a Chi-Square test shows that the distribution is different from chance-distribution at the 0.01 level of significance (Chi-Square 22.4498; D.F. 3). Meaning that there are indeed factors involved indicating that the Malay respondents had the less accurate information.

Similarly, it was anticipated that the size of the city in which pupils attended the later stages of their schooling may have had an effect on the access and accuracy of information on earnings in that the larger towns provide a more favorable environment for obtaining more correct information. TABLE 13 shows that there is a slight difference in so far as the respondents from the smaller towns are slightly more heavily distributed toward the less accurate information. Even though the difference is very small, it is significant at the 0.05 level of significance, (Chi-Square 21.9799; D.F. 12).

ii. Accuracy of Information, (HYPOTHESIS I/2).

Accuracy of information on earnings is related to the source of information.

The source of information, as categorized in QUESTION 13,⁵ implies a hypothetical scale of reliability assuming that "information obtained from Government sources" is more reliable than "unspecific hearsay." The rationale being that Government sources have more data on the overall situation and that the school-related sources may already be distorted by personal experiences of the teachers imparting the information. Also, as soon as that information is communicated through the traditional channels of word-of-mouth and rumors, larger distortions result due to personal biases, misconceptions, limited comparability, lack of perspective, etc.

Several difficulties were encountered in the categorizing of sources of information and the formulation of QUESTION 13. First, perceptions of the respondents were in all likelihood formed by information from several sources, and it was probably very difficult for many of the respondents to isolate the most important source. Second, the scale of reliability

⁵QUESTION 13: What is the most important source of your information about earnings referred to in the previous question?

(Indicate the source by marking the box ☒)

Information you obtained from brochures and statistics issued by Government Departments and the Press. ☐

Information obtained from teachers, school officials and information-talks in your school. ☐

Information from relatives or friends who you think have relevant insight. ☐

unspecific hearsay from various sources. ☐

you do not have information, but you make a guess. ☐

implied in the choice of sources was probably not obvious to all respondents. The pre-testing, however, and follow-up interviews showed that 86 percent of the respondents in the pre-test sample interpreted the implied scales as intended. Third, only the extremes on the reliability scale constitute clear contrasting categories whereas the middle range categories are not easily delineated. The accuracy of the information on earnings was measured by the rank-order-correlation coefficient, obtained from the computation in the context of HYPOTHESIS I/1. The measure of accuracy for each respondent could then be cross-tabulated with the sources of information.

The responses tabulated in the Master Tabulation in APPENDIX B show a distribution skewed toward the supposedly less reliable sources of information. This evidence is in itself interesting, but in the context of providing evidence for HYPOTHESIS I/2, the sources of information have to be related to accuracy of information. Cross-tabulation of the Spearman Rank Order Correlation Coefficient and the sources of information is all that is attempted with the type of data at hand.⁶ The respective data are recorded in TABLE 14.

⁶A correlation analysis could be made if the categories of information were weighted for reliability and thus the data transformed into interval data. It is argued, however, that there is no rationale for applying weights and thus the data conversion would be deceptive.

TABLE 14: ACCURACY OF INFORMATION ON EARNINGS
AND SOURCE OF INFORMATION

Measure of Accuracy Spearman's Rank Order Correlation Coeff.)	% of Respondents who indicated as most important source				
	13.5	18.0	12.9	26.1	27.0
	Government Sources	School- related	Relatives, Friends	Unspecific Hearsay	Guesses
-1.00 - -0.80	0	0	0	0	0
-0.79 - -0.40	0	0	0	0	0
-0.39 - +0.40	0	0	0	0	0
0.41 - 0.80	18.9	16.6	22.4	22.7	22.5
0.81 - 1.00	81.1	83.4	77.6	77.3	77.5
	100.0	100.0	100.0	100.0	100.0

(a) Findings. According to the Master Tabulation for QUESTION 13, there is heavy reliance (40 percent of the respondents) on the less formalized more traditional modes of transmitting information such as the extended family, personal relationships, and hearsay made-up of a multitude of fragments of information. A very significant number (37 percent) of the respondents could not single out one dominant source of information. They were either not receptive to this type of information, or they did not have access to relevant information. Only 23 percent of the respondents were exposed to information through formalized and official channels, such as Government agencies and schools and which was intensive enough to have made a lasting impression.

With regard to HYPOTHESIS I/2, that,

accuracy of information on earnings is related
to the source of information,

the data show that there is no significant connection between

the accuracy of the respondents' knowledge about earnings and the sources from which the respective information was received. In fact, TABLE 14, shows that the degree of accuracy is fairly similarly distributed among all sources of information. A Chi-Square test shows that the distribution is not different from a chance-distribution at the 0.01 percent level of significance. (Chi-Square 14.3500; D.F. 12), meaning that one cannot assume with a high degree of certainty an underlying cause for the differences.

This leads to the conclusion that the prevailing pattern of information-dissemination, heavily relying on informal, traditional modes, is not less effective than the official, formalized sources. Further, that the accuracy of information does not seem to depend on the source of information. It could also be inferred that the information on the relative position of the various professions with respect to earnings is of no great interest to school-leavers, which would tend to suggest that monetary remuneration has no great influence as a decision factor for the school-leavers' career choices. This aspect will be specifically examined later in the contexts of HYPOTHESES I/5 and I/6.

b. Students' Perception of Employment Opportunities.

i. Assessment of Employment Opportunities,
(HYPOTHESIS I/3).

Information about employment opportunities in a significant number of cases is incorrect.

Monetary factors, i.e., earnings, are relatively ineffective in influencing career-choices. It can safely be

assumed that the supply of highly trained manpower does not respond quickly to the high monetary remuneration of certain professions. First of all, there is an inevitable time-lag before the educational system can be geared to the new demands and the actual output of new skills. Second, there is a host of socio-cultural and economic-technical obstacles responsible for the lack of flexibility between the demand and supply of trained experts. Education in general, and higher education in particular, tends to be considered a consumption good that provides spiritual satisfaction, but above all social status. These considerations could be of overriding influence. However, factors suspected to have a bearing upon the individual student's career-considerations are societal values, personal preferences, chances of entry into the various types of education, and (assumed to be rather important) the chances of employment.

It is only rational that the aspirants to higher education and/or their parents make all the above considerations and it would be extremely difficult to isolate any of the elements in a clearcut fashion. Nevertheless, the researcher attaches special significance to the consideration of employment chances. From interviews and observations it appeared that employment opportunities were one of the students' foremost concern. Therefore, the question as to whether employment opportunities are correctly assessed, and whether the career-choices are, in fact, related to students' perception of employment opportunities, is of interest.

Several considerations were made with regard to obtaining data on the assessment of employment chances by the aspirants. With QUESTION 14,⁷ respondents were supposed to assess employment opportunities for a range of professions, and were thus induced to view their own chosen careers in the perspective of other professions. A ranking of the employment opportunities was attempted, but interviews and pre-tests revealed that the employment opportunities, as perceived by the respondents did not lend themselves to ranking. The assessments were less discrete. Consequently, QUESTION 14 was changed to attempt measuring employment opportunities on a verbal-ordinal scale, ranging from "very good" to "very difficult". The main purpose was to analyze whether the students' assessments varied considerably from those which were founded on a more factual information base. It was impossible to obtain statistical information on the present and future employment opportunities of university-trained professions. There are estimates of present shortages in certain professions, but there was not enough systematic information

⁷QUESTION 14:

According to your information, what are
employment-opportunities for people with
qualifications for the following professions?

(Categories of professions and verbal-
ordinal ranking can be seen in TABLES
15 and 16.)

to form a coherent picture of present and potential demand for university graduates in the different fields of study. It was decided, therefore, to resort to expert opinion as a yardstick. This was based on the assumption that the particularly interested expert may have access to a wider information base and be better able to develop a perspective on the employment situation. Eight knowledgeable persons were asked to respond to QUESTION 14 and to categorize the employment opportunities of the listed professions. The categorization turned out to be uniform enough to discern an overall pattern as shown in TABLE 15.

Even though the assessment of the various experts seems slightly divergent, when the modes are ranked, a clearcut expression of the majority's assessment appears in this aggregate ranking. As a measure of association, Kendall's Coefficient of Concordance was computed, which turned out to be 0.8760. In view of the fact that only verbal-ordinal data was obtained, only a descriptive comparison of the tabulation of students' and experts' assessments is attempted.

TABLE 15: EXPERTS' ASSESSMENT OF EMPLOYMENT OPPORTUNITIES*

various professions	different experts								overall ranking (modes)
	A	B	C	D	E	F	G	H	
various engineers	1	2	2	3	4	2	2	2	2
higher-level government administrator	2	3	2	4	3	2	4	2	2
business executive	2	4	3	5	4	1	2	2	2
secondary-school teacher: arts	3	2	3	2	3	2	4	2	2
secondary-school teacher: science	2	2	1	2	2	1	2	1	2
university lecturer	2	3	4	3	1	4	2	2	2
medical doctor	2	1	1	1	1	2	1	1	1
scientist	2	2	1	4	3	2	5	3	2

* verbal-ordinal scale: very good = 1; good = 2; not so good = 3; difficult = 4; very difficult = 5;

Two Experts of the University Administration, two members of the Faculty of Education; one advisor at the Economic Planning Unit, 2 officers from the Educational Planning and Research Division, Ministry of Education; one staff of Counseling Service. (Ethnic association was: 3 Chinese, 3 Malays, 2 Expatriates).

In TABLE 16, the frequencies of respondents' assessments of employment opportunities for each profession are expressed in percentages. Comparing the percentage distributions shows that the assessments by students and experts are very similar: the modes as well as the medians have similar distributions. A statistical measure of association is inappropriate in view of the small numbers of experts compared with the large numbers of students and in view of the fact that only verbal-ordinal scales were involved.

The close similarity of the overall judgement of both students and experts obscures the fact that there are large numbers of students who divert from the majority's judgement. In order to arrive at a more discriminatory evaluation, a Spearman Rank Order Correlation Coefficient is computed for each student's ranking and the experts' ranking and these coefficients are categorized in TABLE 17.

TABLE 16: COMPARISON OF EXPERTS' AND STUDENTS' ASSESSMENT OF EMPLOYMENT OPPORTUNITIES

	Students' Assessment					Experts' Assessment				
	very good	good	not so good	diffi- cult	very diffi- cult	very good	good	not so good	diffi- cult	very diffi- cult
various engineers	31.4	51.4	5.4	7.1	1.4	12.5	52.5	12.5	12.5	0
higher-level govern- ment administrator	7.3	25.4	21.7	22.4	8.5	0	50.0	25.0	25.0	12.5
business executive	15.9	2.0	15.6	19.9	3.2	12.5	57.5	12.5	25.0	12.5
secondary-school teacher: arts	16.7	51.4	29.9	14.3	4.7	12.5	57.5	37.5	12.5	0
secondary-school teacher: science	30.1	54.6	8.5	3.7	0.4	37.5	52.5	0	0	0
university lecturer	14.4	5.0	17.2	16.4	3.1	12.5	57.5	25.0	25.0	0
medical doctor	55.0	30.0	2.8	6.0	2.2	75.0	25.0	0	0	0
scientist	19.5	56.4	16.2	15.9	8.9	12.5	57.5	25.0	12.5	12.5

○ denotes modes
 ∨ denotes medians

TABLE 17: ACCURACY OF INFORMATION ON EMPLOYMENT OPPORTUNITIES - CROSS-TABULATED WITH RACE AND SIZE OF TOWN

Spearman Rank Order Correlation Coeff. (categorized)	Total % of Respondents	Cumulative % of Respondents	Race		Size of Town**				
			Malay	Non-Malay	1	2	3	4	5
-1.00 - -0.80	0	0	0	0	0	0	0	0	0
-0.79 - -0.40	0	0	0	0	0	0	0	0	0
-0.39 - +0.40	1.2	1.2	1.2	0	0	0	0	0.2	1
0.41 - 0.80	19.5	20.7	22.8	17.9	20.7	21.5	21.7	12.5	25.2
0.81 - 1.00	75.0	95.7	76.0	82.1	79.3	78.5	78.3	87.5	74.8
	95.7*		100.0	100.0	100.0	etc.			

* the remaining 4.3 % did not answer the question completely and were eliminated in the tabulation

** sizes of towns categorized as in TABLE 13.

(a) Findings. If a rank correlation coefficient of + 0.80 and above is taken as a measure of accurate information, then 75 percent of the respondents reach this level of accuracy, according to TABLE 16. This means that information on employment is much more exact for larger numbers of students than the information on earnings. Of course, the comparison is somewhat hampered by the fact that for employment informa-

tion only verbal-ordinal data was obtained, while information on earnings was represented by numerical-ordinal data which constitutes a slightly more discriminatory measure. The large percentage of accurately assessed information warrants the conclusion that the data does not support the HYPOTHESIS I/3 that,

information about employment opportunities
in a significant number of cases is incorrect

The same cautions as were referred to in the context of HYPOTHESIS I/1 apply here, mainly due to the fact that what was measured was not objective, factual information but subjective judgement. Further, the traditional association of ethnic groups with specific activities and the recent government policies to alter the pattern of race and economic activities, may have affected the assessment of many of the respondents and in fact, could have caused the slight divergence. For instance, Chinese students may have perceived employment chances as high-level government administrators much less optimistically than Malay students. On the other hand, Malay students and female students of all races, may be inclined to assess the employment chances as business executives to be less favorable. This is under the assumption that students are inclined to judge the employment situation from their own perspective, ethnic, cultural or social, rather than take the overall situation into account. These tendencies are likely to cancel out to some extent in the aggregate comparison, but they might mitigate against the accuracy

of information for many students. Moreover, the individual's information may be very accurate when he assesses his own chances for employment, taking into account his own assets and liabilities.

In order to discover possible differences in the access to information and its accuracy, depending on ethnic background or the size of the urban environment in which the respondent attended upper secondary school, cross-tabulations of the measure of accuracy with race and size of city were made in TABLE 17.

The slight difference in the distribution among Malays and non-Malays insofar as a slightly higher percentage of the non-Malays have more accurate information is significant at the 0.01 level (Chi-Square 11.3490; D.F. 1).

The Chi-Square test for the data on size of city shows that the distribution of respondents is not significantly different from chance, at the 0.05 level of significance, which is reason to conclude that the size of city in which the respondents attended upper secondary school has no significant influence on the accuracy of information on employment.

ii. Accuracy of Information, (HYPOTHESIS I/4).

Accuracy of information on employment opportunities is related to the source of information.

Whether the similarity or discrepancy of the respondents' assessments is related to the source of information was

examined in this context. The source of information is categorized along an assumed scale of reliability as expressed in the options given in QUESTION 15.⁸ As TABLE 18 shows, a significantly larger percentage of respondents received information on employment from supposedly more reliable and official sources, compared to the predominantly informal sources of information on earnings.

TABLE 18: SOURCES OF INFORMATION ON EARNINGS
AND EMPLOYMENT OPPORTUNITIES

Sources*	Earnings	Employment
	% of Respondents who indicated as most important source of information	% of Respondents who indicated as most important source of information
Government Sources	10.4	13.5
School-related Sources	12.7	18.0
Relatives, Friends	15.1	12.9
Unspecific hearsay	24.8	26.1
Guesses	36.9	27.0

* as categorized in QUESTIONS 13 and 15

That these differences were not attributed to chance but had an underlying cause was supported by a Chi-Square test which shows that the differences were significant at the 0.01 level (Chi-Square 30.7576; D.F. 4).

⁸QUESTION 15:

What is the most important source of your information about employment opportunities referred to in the previous question?

(Indicate the source of most of your information by marking the box ☒)

- unspecific hearsay from various sources ☐
- information from relatives or friends who you think have relevant insight. ☐
- information you obtained from brochures and statistics distributed by Government Departments and the Press. ☐
- information obtained from teachers, school officials and information-talks in your school. ☐
- you do not have information, but you make a guess ☐

In connection with QUESTIONS 13 and 15, a check was made with respect to consistency with which the respondents answered questions. The categories in QUESTION 15 were listed in a different sequence from QUESTION 13 in order to test a frequently observed tendency of respondents to choose the first options listed. It turned out that the pattern of responses was rather consistent as is evident when comparing the percentage distributions in TABLES 14 and 18. This also serves as an indication that respondents carefully read and completed the questionnaire.

The source of information was cross-tabulated with the measure of accuracy, the results of which are listed in TABLE 19.

TABLE 19: ACCURACY OF INFORMATION ON EMPLOYMENT OPPORTUNITIES--AND SOURCE OF INFORMATION

Measure of Accuracy Spearman's Rank Order Correlation Coeff.)	% of Respondents who indicated as most important source				
	13.5	18.0	12.9	26.1	27.0
	Government Sources	School- related	Relatives, Friends	Unspecific Hearsay	Guesses
-1.00 - -0.80	0	0	0	0	0
-0.79 - -0.40	0	0	0	0	0
-0.39 - +0.40	0	0	0	0	0
0.41 - 0.80	18.9	16.6	22.4	22.7	22.5
0.81 - 1.00	81.1	83.4	77.6	77.3	77.5
	100.0	100.0	100.0	100.0	100.0

(a) Findings. The reliance on less formalized, more traditional modes of information is not so prominent. This could mean that students are either more actively interested and more immediately concerned and thus seek information through formal official channels, or that information on employment is more effectively disseminated by the Government agencies.

With regard to HYPOTHESIS I/4, the data show that there is no significant relation between the accuracy of information about employment opportunities and the source from which it was obtained. A Chi-Square test confirms that the distribution is not significantly different from a chance distribution at the 0.01 level of significance. (Chi-Square 6.8333; D.F. 4).

c. Relating Perception of Earnings and Employment Opportunities to the Choice of Field of Study,
(HYPOTHESIS I/5).

Individuals' choices of careers in a significant number of cases are not related to assessments of earnings or of employment opportunities.

The information on earnings and employment is to be set in relation to the individual's choice of career. In essence, the inquiry is to probe how many career-choices are made in accordance with an optimistic assessment of earnings and/or employment opportunities and how many choices are made against better knowledge of unfavorable prospects. It must be anticipated that not all career-choices which coincide with favorable assessments are necessarily a result of deliberate and rational decision-making determined by the factors mentioned. Other criteria such as status and family tradition or students' inclinations, interests and motivation could be of overwhelming influence and may have just happened to coincide with envisioned prospects of high earnings and/or good employment prospects.

In this context it is not important whether a student's information on earnings and employment is more or less accurate. In fact, a student may choose a career which he incorrectly believes rates high in terms of earnings or employment chances. This student still responds to market considerations, even though his picture of the market is incorrect. Nevertheless, he reacts consistently. For the purpose of assessing a possible linkage between career-choice and assessment of income and employment, two aspects were considered. First, the perception of respondents whose career-choices coincide with an optimistic assessment of earnings and employment opportunities. In this case there is no conclusive evidence as to the influence of the market forces, because a multitude of other decision-inputs could be dominant and the positive association with market-factors could be coincidental. Second, the percentage of respondents who chose a career in spite of their pessimistic assessment of earnings and/or employment opportunities. In this case, we would conclude that aspects other than market-factors must have had a dominant influence.

TABLE 20 contains a cross-tabulation of the students who aim to become, for instance, engineers; their ranking of the earnings of engineers and their assessment of the employment opportunities for engineers. The same data were cross-tabulated for the other seven professions. (A complete listing of the ranking of career-choices is contained in APPENDIX B.)

TABLE 20: RESPONSE TO EARNINGS AND EMPLOYMENT OPPORTUNITIES

Career-Aims	No. of Respondents		Respondents who ranked Earnings in 1 st and 2 nd position (cumulated %)	Respondents who rated Employment Opportunities "very good" and "good" (cumulated %)	Respondents' Assessment of their own employment-chances after graduation (% distribution)			
		%			1*	2	3	4
engineers	166	8.3	14.4	90.9	39	39	5	17
higher-level government administrator	427	21.3	13.6	52.7	28	49	6	14
business executive	304	15.2	55.6	67.8	18	52	6	17
secondary school teacher	544	27.1	0.6	52.6 (arts) 90.3 (science)	47	42	2	9
university lecturer	271	13.5	6.3	60.5	42	37	6	12
medical doctor	113	5.6	41.6	93.8	61	28	3	8
scientist	167	8.3	5.4	57.5	23	52	9	16

* as categorized in QUESTION 16: 1: find employment easily in his field
 2: finds employment with some difficulties in his field
 3: finds employment easily of some kind, not related to his field
 4: expects to be unemployed for some time

In addition, TABLE 20 contains cross-tabulations of the data obtained through QUESTION 16, in which students were asked to judge their own employment chances after graduation.

(a) Findings. The cross-tabulations reveal that students' career-choices are not significantly related to optimistic assessments of earnings for the respective professions. In contrast, optimistic assessment of employment opportunities seems to be rather loosely related to career-choice. This difference is documented by the cumulated percentages in columns 4 and 5 in TABLE 20. In particular, it can be observed that relatively large numbers of students, (21.3 percent) indicated "government administrator" as their career aim, whereby only 13.6 percent of them assess the earnings of government administrators optimistically. Likewise, 27 percent of the respondents aim to become

teachers, whereby 99 percent of them perceive teachers' remuneration to be the lowest of the listed professions. If these findings are compared with the data for employment opportunities, a rather close association appears to exist between career-choices and an optimistic assessment of employment opportunities.

These findings are reinforced by the cross-listing of the respondents' assessments of their own employment chances after graduation, although there is more of a spread between the optimistic and the pessimistic assessments, which could reflect apprehension on the basis of ethnic discrimination. For instance, the larger numbers of respondents who see their employment chances as administrators optimistically could be Malays. The Chinese would most likely view their employment chances as business executives more hopefully. Those who aspire to be engineers and scientists may judge on the basis of what they know or have heard about the employment structure and hiring-practices which still does not provide much scope for the scientifically-technologically-oriented professions.

Further evidence that employment considerations play a much stronger role, compared with monetary considerations, is provided by the response to QUESTION 18.⁹ As can be seen from the Master Tabulation in APPENDIX B, 80 percent of all respondents rank "more and better opportunities to find employment" as

⁹QUESTION 18:

Rank the advantages of a University degree
according to their importance to you !

[mark the most important with 1
the next most important with 2
and so on for all 5 items]

higher income	<input type="radio"/>
higher prestige	<input type="radio"/>
more and better opportunities to find employment	<input type="radio"/>
more interesting and satisfying work	<input type="radio"/>
easier life	<input type="radio"/>

the most, and second most important advantage of a university degree. Only 25 percent rank "higher income" in the first and second positions of importance. This empirical evidence can be interpreted as supporting a part of the HYPOTHESIS I/5; namely that,

the individuals' choices of careers in a significant number of cases are not related to assessments of earnings.

At the same time, the other part of HYPOTHESIS I/5, that

the individuals' choices of careers in a significant number of cases are not related to assessments of employment opportunities,

can be rejected on the basis of the data. In fact, it is indicated that employment considerations are a foremost consideration.

d. Conclusions of the Research on Market Influence on the Channeling Process

The preceding analysis was intended to test whether there is a relationship between the market factors, "remuneration" and "employment opportunities" and the "career-choices" of the aspirants to higher education. It was found that the information on "employment opportunities" was generally more accurate than the information on earnings. This could be interpreted as employment considerations being a more important factor for the aspirants' decision-making.

The accuracy of information on employment and earnings is not related to the sources of information. Perceptions of students whose information was derived from official and formal

sources were not necessarily more accurate than the perceptions formed on the basis of information through informal, traditional channels. Likewise, it was found that a comparison of the influence of urban or rural social environment shows no significant effect on the accuracy of information. However, ethnic characteristics seem to have a significant influence in that more Malays have less accurate information on earnings as well as on employment opportunities.

Concerning the relationship between students' assessments of earnings and employment opportunities and their own career-choices, it was found that large numbers--in fact a majority--of new students opted for careers which they did not rate high in terms of earning potential. In addition, the new students' career-choices, in the majority of cases, corresponded to their positive assessments of employment opportunities. This finding was reinforced when respondents indicated how they gauged their own employment chances. The finding, however, that information on "employment opportunities" was more precise than information on "earnings" can be interpreted as employment considerations being a more important factor.

No conclusion can be reached as to cause and effect in the relationships between career-aim and the market factors of "remuneration" and "employment opportunities". Even though there is a strong connection between choice of career and

favorable assessment of employment opportunities, it would be unrealistic to conclude that students' career-choices are in response to the employment chances. It could be hypothesized that the chain of causation is reversed; namely that students, when locked in on the path towards a certain career, optimistically assume favorable employment chances. The fact that their assumptions are generally fairly accurate when compared with expert opinion may indicate that the present employment structure, hiring practices and the educational system support each other in a circular causation. That is to say, that the larger numbers of liberal arts graduates have been absorbed into the administrative-managerial and teaching professions, due to the prevailing hiring practices and that this forms the basis for students' expectations.

Nevertheless, the findings are important, despite their isolation from obviously more complex interrelationships, in that they suggest employment opportunities as an "instrument-variable". Evidence that most of the respective information is disseminated through informal, traditional channels and is subsequently based on past and present experience of parents, relatives and friends of students, suggests that information dissemination has not been utilized extensively as an instrument to prepare the public for a changing employment structure, incentive systems and skill-requirements.

B. Socio-Cultural Influence on the Choice of Field of Study and Career

There can be no doubt that societal and cultural factors play a profound role in the entire educational experience, motivation, personality and ability of each individual student. On the aggregate basis society's value-system is reflected in the attitudinal and behavioral characteristics of the student body. Likewise, the educational institutions and processes are interdependent with the social and cultural environment.

It would lead too far afield to specifically examine values and preferences particularly relevant in defining the role of higher education in Malaysia. It must suffice to re-emphasize here some of the observations made in Chapter III, namely that the University as an institution is in a turbulent phase of finding its identity and functions within society. Malaysian society is made up of culturally diverse segments and it is often hypothesized that many students consider the university in a rather limited role of a new and non-traditional avenue to status and influence. This is to be reconciled with the University's function as the supplier of manpower with the highest skill-levels, as an institution to instill innovative attitudes and to prepare leaders concerned with the welfare and progress of the nation. Thus, the University is beset by inconsistent societal demands and conflicts.

In the context of this study, the focus is upon the characteristics of the student-intake, their social background, their motivations, and their expectations. At the

time of admitting a new generation of students, the University is confronted with the attitudes and values which have been implanted by the preceding levels of education and, of course, by the environment of family and community. As the University is also a part of the educational system and the social-cultural environment it must also, at least in part, be anchored in the very same value-system. How profoundly can the university really affect students' attitudes and preferences in general and with respect to the choice of field of study in particular? Some discussion of these questions is contained in Chapter VIII.

The following discussion attempts to account for a measure of newly-admitted students' status-origin, achievement orientation and activity preferences, without any claim to revealing the psychological forces at work in each student and in the student body. The complex aspects of attitudes and motivations are difficult to gauge in any measureable and comparable way. It is recognized that the survey cannot answer questions as to the subconscious reasons why respondents feel and act the way they indicated in the questionnaire. Besides, the questionnaire itself cannot be considered a psychologically refined enough tool for this purpose.

When the responses of students are related to their choice of field of study, there can be no claim as to revealing the causal relationships. The observations yield answers to very limited aspects and, at the same time, open up a plethora of other questions. The researcher chose to concentrate

on a few aspects which are widely used in sociological and educational research and relate these to the channeling process.

a. Status-Origin. Status-origin is conceived of here as a measure of the economic activity and the educational attainment of the students' fathers and the social-communal involvement of their families. The variable "status-origin" is then related to "choice of faculty." Since the relationship can only be indirect, two intervening variables are explored. The "wider choices enabled students through the quality of their schooling" and "motivation and attitudes towards studying".

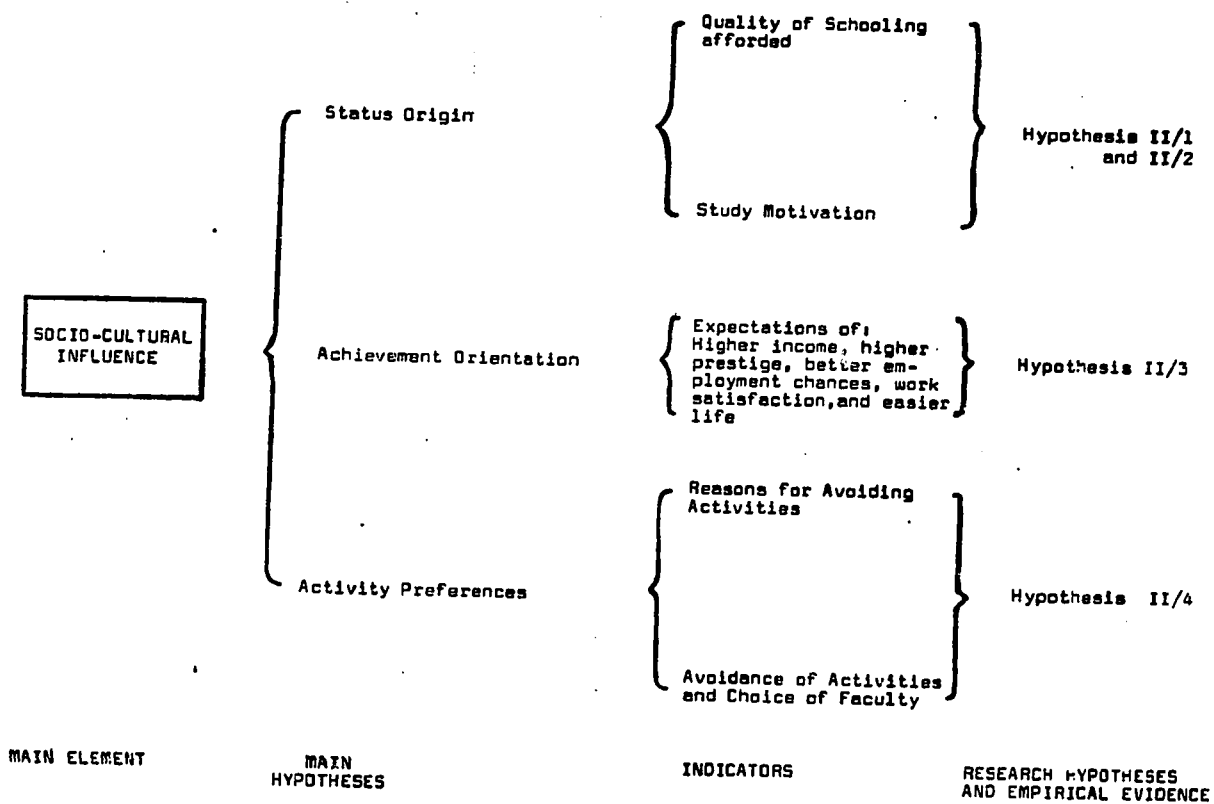
b. Achievement-Orientation. Achievement-orientation is categorized into several types of expectations beyond obtaining a university degree. The expectations of higher income, higher prestige, better employment chances, work satisfaction, and an easier life. These aspects are analyzed in their relation to the choice of faculty. Since the expectations of each individual student are partly determined by his socio-cultural milieu, the various types of expectations are also explored in their relationship to status-origins and race.

c. Activity Preference. Activity preference is associated in this study with life-style and work tasks after the completion of schooling. There seems to be a world-wide tendency of aspirants and graduates of higher education to associate their attainment of advanced education with obtaining the

amenities of life. Every society has standards and comforts which are associated with social strata. Higher education is commonly linked with the expectation of entering into a significantly higher stratum.

Such tendencies towards comfort, amenities, status and often complacency must be contrasted with the enterprising spirit of youth. Young people are more likely to be enticed into taking more risks; to endure deprivations for the sake of enterprise and adventure; to develop initiative towards the unconventional; and even to rebel against traditions and rigidities. How well the educational system, and especially higher education is adapted to culture and how well it constructively utilizes these latent or manifest features of youth is a decisive factor in the effectiveness of education towards development. However, this is difficult to measure and there are no empirical studies in Malaysia which attempt to weigh youthful innovative drive against the acculturation into what is perceived as the comfortable life-style of the elite. In the context of this study, a very limited attempt is made to sound out students' inclinations to avoid those kinds of activities which are commonly ranked lower on society's scale of preference.

The following chart shows the line of argument in exploring how the socio-cultural influences on the channeling process are related to the discussion of empirical information.



1. Research on Socio-Cultural Influences, Hypotheses
II/1 - II/4

a. The Effects of Status-Origin.

i. Status-Origin and the Wider Choices Enabled
Students Through Schooling,
(HYPOTHESIS II/1).

Higher status-origin enables an aspirant to choose from the more "difficult" fields of study, due to better educational preparation.

The status of the family from which the aspirants to higher education originate is seen as having a twofold bearing upon the choice of field of study: one is the motivational factor, the other is the wider choice enabled pupils through schooling. Both factors are suspected to be part of the families' socio-cultural atmospheres. The instilling of motivation into a youngster is most likely supplemented by efforts to promote a higher educational attainment. Under conditions of equal and unconstrained educational opportunities, both factors are easily complementary and perfectly correlated. However, the condition of equal opportunity is fictitious and inequalities persist in the educational system in Malaysia as was elaborated in Chapter IV.

We will thus have reason to examine separately the motivational and the enabling factor, both of which enter into the relationship between the choice of faculty and status-origin. Status of the families of students is gauged by three different criteria and the respective information gained through three different questions in the questionnaire. Information on the

occupation and income of fathers is asked for in QUESTION 7. The fathers' level of educational attainment is categorized in QUESTION 8, and a measure of the families' communal involvement is derived from QUESTION 10. It was fully appreciated that the measurement of communal involvement as well as of economic status would present difficulties. First, designation of activities is not clearly related to a measure of income. Remuneration can be different within the same activity depending, for instance, on whether the recipient is employed in a large-scale enterprise or in a small-scale operation. In order to avoid confronting the respondents with complex categorization schemes in the questionnaire, it was considered more advantageous to categorize the information a posteriori. Seven categories for the information on economic status comprised a combination of scales, such as, owners, operators, wage-earners of large-scale, medium-scale or small-scale establishments; government employees on different levels; agricultural small-holders and wage earners, petty traders and petty service operators; teaching professionals on several levels; other professionals--employed and self employed; retirees with various levels of receipts; recipients of support by other family members; and individuals at the subsistence level.¹⁰ The classification scheme is detailed in APPENDIX C.

¹⁰ QUESTION 7:

What is your father's or guardian's occupation, or the source of his income ?

[describe in detail,
indicate whether employed or self-employed,
whether working in small, medium, or large firm]

write legibly in here

The response-categories are listed in TABLE 21.

Experience gained from the pre-tests, showed that this was a viable classification. It was also found that the information volunteered in response to QUESTION 7, was relatively easy to classify into one of the seven categories. Only in 8 percent of the responses did ambiguity necessitate arbitrary allocations. It is, of course, not possible to judge how conscientiously and accurately the respondents answered the question since no follow-up interviews could be conducted to verify the responses.

With regard to QUESTION 10, an unexpectedly large percentage did not indicate any communal-organizational activity within the immediate kinship and rendered this information less relevant for further use. A tabulation of the information on communal involvement and the categorization scheme is contained in the tabulations in APPENDIX B and APPENDIX C, respectively.

In TABLE 21, economic status is related to educational attainment of the fathers' of the respondents. The correlation is rather close and the explanation obvious. A significant observation is that a sizeable percentage of fathers with only lower levels of education had advanced into positions of higher economic status. This is easily explained for a generation to whom a higher level of formal education was by no means the most important single factor for gains in economic status. In the context of the research hypothesis, the focus is on how the newly-admitted students in each faculty originate from families with various economic and educational statuses. TABLE 22 shows

TABLE 21: ECONOMIC STATUS-ORIGIN AND EDUCATIONAL
ATTAINMENT OF RESPONDENTS' FATHERS

Father's Economic Status			Fathers' Educational Attainment				
			University	Post-Secondary	Secondary	Primary	
			(In % of total of each Economic Status Category)				
high ↑ ↓ low	1	large-scale business executive; government officer, highest level; professional, self-employed	0.8	72	12	16	0
	2	large-scale business wage earner; highly skilled; medium-scale business owner-operator; government officer, high level; university lecturer; professional, employed	5.3	51	20	22	8
	3	large-scale business wage earner, skilled; medium scale business, operator; government officer, medium level; teacher, secondary and primary; supported by well-to-do kin; retired (with secondary education)	24.3	19	28	22	31
	4	large-scale business, wage earner, unskilled; medium-scale business, wage earner, skilled; small-scale business, owner-operator; government officer, low level;	32.1	0	10	16	13
	5	medium-scale business wage earner, unskilled; small-scale business wage earner, skilled; small-holder, owner-operator; supported by poor relatives; retired (with primary education)	33.3	0	0	9	91
	6	small-scale business wage earner, unskilled; small-holding operator or wage earner; petty trader, petty services;	4.1	0	0	0	100
	7	subsistence level	0.1	0	0	0	0
	8	no responses	0.8	0	0	0	0
% of all Respondents (no response 4.0%)			1.9	10.9	29.8	53.3	

some significant differences among students opting for the various faculties. Comparing the status-origin of the total intake of new students into the university, a most prominent feature--that the students entering the Arts Faculty are heavily distributed towards the lower economic status-origin--emerges. The same is true for the entrants into the Faculty of Agriculture. The Engineering, Science and Economics Faculties attract more than a proportionate share of the students from the higher economic status-origin. A very similar picture emerges from TABLE 23 relating to the educational attainment of the fathers and the choice of faculty of their

TABLE 22: ECONOMIC STATUS-ORIGIN AND
CHOICE OF FACULTY

Father's Economic Status			Applicants to Each Faculty (in rounded % of total number applying to respective Faculties)					
Categories as in TABLE 21			Economics & Admin.	Arts	Sciences	Engineering	Medicine	Agriculture
	% of total							
1	high	0.8	1	0	1	1	2	0
2		5.3	7	3	2	5	15	9
3		24.3	27	20	29	30	32	16
4		32.1	35	27	38	32	36	39
5		33.3	26	46	24	26	14	34
6		4.1	4	4	6	6	1	2
7		0.1	0	1	0	0	0	0
8	low	0.8						
Number of Applicants to Each Faculty			503	869	261	162	166	44
% of Total Admissions			25.1	43.3	13.0	8.1	8.3	2.2

TABLE 23: EDUCATIONAL STATUS-ORIGIN
AND CHOICE OF FACULTY

Father's Level of Formal Education		Applicants to Each Faculty (in rounded % of total number applying to respective Faculties)					
	% of total	Economics & Admin.	Arts	Sciences	Engineering	Medicine	Agriculture
University	1.9	2	1	2	1	5	2
Post-Secondary	10.9	11	11	10	10	14	7
Secondary	29.8	39	22	36	27	37	21
Primary	53.4	45	61	48	56	40	66
No Responses	4.0						
100.0							
Number of Applicants to Each Faculty		503	869	261	162	166	44
% of Total Admissions		25.1	43.3	13.0	8.1	8.3	2.2

children. Again, new students entering the Arts and Agricultural Faculties are heavily concentrated in the lower-status category. The large portion of engineering students with low educational status-origin is surprising. This is at variance with the observation shown in TABLE 22 that the engineering students tend to come from families with higher economic status. An explanation could be that there is a larger proportion of high-achievement families involved, who started with little education but improved their economic status significantly. New students entering the Medical, Economics, and Science Faculties originate in proportionally larger numbers from families with higher levels of education. The difference, however, is mainly between the primary and secondary schooling levels, which is not surprising when the fact that post-secondary education and beyond was a rare achievement for the particular generation of parents is taken into account.

Having established that there are indeed significant differences in how students from families with diverse educational and/or economic statuses are distributed over the various faculties, the intervening variables which are suspected to be instrumental in bringing about these results are investigated. First to be analyzed, will be whether the new students of higher status-origin are enabled to have wider choices due to their schooling experience. Not having access to the highschool examination scores, several indirect indicators for the quality of schooling could be used, such as the stream, the medium of

instruction, the size of city, or the student's self-evaluation of his capabilities in certain subjects. All these indicators are thought to be relevant in this context. This is based, in part, on the observations in Chapter IV, that the science-stream schools, and particularly those in the larger cities, are likely to provide a more rigorous schooling. It seems to be considered generally, by pupils and parents in Malaysia, that the science-stream is the more difficult avenue of schooling and that the scientific and technical fields of study at the university are more difficult to enter and pursue. Rather clearcut evidence for the latter perception is contained in the ranking of the degree of difficulty of study in the various faculties as the tabulated responses for QUESTION 34 show in APPENDIX. B.

TABLE 24 shows a relationship between status-origin and the type of highschool streaming, in that higher status-origin

TABLE 24: ECONOMIC STATUS-ORIGIN AND
HIGHSCHOOL STREAMING

Father's Economic Status			Secondary School Stream in which respondents obtained High School Certificate	
Categories* as in TABLE 21			Arts-Stream	Science-Stream
		% of total		
1	high	0.8	22	78
2	↑	5.3	24	76
3		24.3	29	71
4		32.1	64	36
5	↓	33.3	79	21
6	low	4.1	79	21
All new students			68 %	32%

*Categories 7 & 8 are eliminated in this Table

results in a higher incidence of schooling through the science-stream.

The foregoing provides evidence for HYPOTHESIS II/1 that higher status-origin does indeed better enable aspirants to apply to the more "difficult" faculties. Status-origin is thus found to be an important factor for the quality of the educational experience in general and during the decisive phase of streaming in secondary schooling in particular.

ii. Status-Origin and Study Motivation,
(HYPOTHESIS II/2).

Higher status-origin is related to stronger motivation to advance through education.

This analysis has to rely on more subjective, attitudinal information. Admittedly, the method of data gathering was not psychologically very refined and this must be kept in mind when interpreting the following.

As a measure for the determination to pursue further education, a number of alternatives were offered which the respondents were assumed to have contemplated and which they could indicate in QUESTION 19.¹¹ It was assumed that many

¹¹ QUESTION 19:

If you were not admitted for study
at the University what would you
want to do instead?

(Indicate which you prefer by
marking the respective box ☒)

try to enter into professional training or into a college for full - time study	<input type="checkbox"/>
get a job and study part-time	<input type="checkbox"/>
try to work your way up through excellence in a job	<input type="checkbox"/>
be content to make a living from a satisfactory job	<input type="checkbox"/>
be unemployed, stay at home	<input type="checkbox"/>

applicants, while waiting for admission to the University, might have considered alternatives in the event that their application was rejected. Exploratory interviews showed that these alternatives were good indicators for the determination to continue education and that they embrace the range of considerations that the applicants made. The scale as tabulated in TABLE 25 implies a decreasing degree of determination ranging from a very strong resolution expressed by "trying to enter into other types of training", to indifference expressed by "staying at home and being unemployed".

TABLE 25: ECONOMIC STATUS-ORIGIN
AND STUDY MOTIVATION

Father's Economic
Status

Indications of Study Motivation:
if respondents were not admitted into the University
they would react as follows:

Categories* as in TABLE 21		enter into other types of training	get a job and study part-time	try to advance through excellence in a job	content to make a living from a satisfactory job	stay at home, be unemployed
	% of total	(in % of the students newly admitted to each Faculty)				
1 high	0.8	50	19	19	6	6
2	5.3	76	17	6	1	0
3	24.3	45	32	17	4	1
4	32.1	43	36	16	4	1
5	33.3	30	44	22	3	1
6 low	4.1	24	48	24	2	1
All new Students		40	37	18	3	1

* Categories 7 & 8 are eliminated because of the very small entries

TABLE 25 shows how the respondents from a particular status-origin were distributed over the motivation scale. The distributions in the rows of TABLE 25 can be compared with the distribution of responses of all new students. A first finding was that 77 percent of the respondents indicated the desire to pursue some kind of study-program in the event that they were not admitted

to the University. On the lower end of the scale, there are only very few responses. It thus appears that motivation to advance through education is prevalent throughout the new generation of students. There is a markedly pronounced preference for part-time studies as an alternative. This is apt to be a result of financial considerations. Applications from lower economic status-origin students are likely to include a greater number of applicants dependent on financial aid. These students logically link their decisions to the scholarship award. If the scholarship awards were not given, part-time study would be the only feasible alternative.

Additional data are available on what could be termed "attitudes towards studying". QUESTION 20 contained response-categories implying a scale from positive opinion to indifference about the several years of study ahead of the newly-admitted students.

TABLE 26: ECONOMIC STATUS-ORIGIN AND
ATTITUDE TOWARD STUDYING

Father's Economic Status		Indications of Attitude: newly admitted Students' opinion about the prospect of several years of study ahead of them			
Categories* as in TABLE 21		happy and interested	necessary to get ahead	waste of time but are compelled	no opinion
		(in % of the students originating from each status category)			
1	high	19	62	6	13
2	↑	22	73	1	4
3		22	69	3	6
4		18	74	3	5
5	↓	14	78	3	3
6	low	20	74	4	2
All new Students		18	73	4	5

*Categories 7 & 8 are eliminated in this Table

The results in TABLE 26 again show positive attitudes with no discernible pattern by an overwhelming majority. The hypothesis concerning the relation between the status-origin and study motivation must be rejected.

The fact is that a majority (75 percent of all respondents) consider studying as "necessary to get ahead" and only 18 percent indicate being "happy and interested". Apparently, the pursuit of education as an end in itself is not a very viable principle in the Malaysian circumstance. Striving for material betterment, better employment chances, a better stance and status in the dynamic development process and the chances this opens, are the overriding concerns. Surveys in industrialized countries have yielded similar insights, namely, that a majority of university students view their studies as an instrument for career advancement, rather than an avenue for personal enlightenment.¹²

(a) Findings. The foregoing evidence suggests that HYPOTHESIS II/1 be upheld. Status-origin, that is economic status as well as educational status, of the families from which the new students come, is significantly related to the choice of field of study. But this is largely explained by the fact that the higher status-origin enables aspirants to choose from the more "difficult" fields of study. As was shown in a different

¹² E. Ginzberg, Career Guidance: Who Needs It, Who Provides It, Who Can Improve It, New York: McGraw-Hill Book Company, 1971, p. 22.

The Career Service Division, Job Opportunities Beckon Students, Indiana, Pennsylvania: Indiana University of Pennsylvania, 1972, p. 1, 5.

context, the more "difficult" fields of study are also avenues to enter into more prestigious professions with higher earning potential. The explanation is offered that higher status-origin affords better schooling in general and in many cases, schooling through the science-stream is preferred.

Motivation to pursue studies and attitudes towards the long study-programs are relatively equally distributed and not significantly dependent on status-origin. HYPOTHESIS II/2 relating to status-origin and motivation can thus be rejected.

While the present generation of aspirants to higher education seem to be equally motivated to pursue studies, unequal educational opportunities, the quality of education--the disparities of the preceding levels in particular--seem to constrain the students from the lower economic status-origins.

b. Effects of Achievement-Orientation.

i. (HYPOTHESIS II/3).

Achievement-orientation is unevenly distributed among the students admitted to the various fields of study.

Achievement-orientation is measured here in terms of the expectations from obtaining an academic degree. Expectations are defined in this context as achievements which are within the realm of possibility from a course of action. Four types of expectations are categorized; status expectations, income expectations, employment expectations, and expectattions of an earier life. Respondents

were asked to respond to QUESTION 18¹³ by ranking the various expectations according to the importance they placed on them. TABLE 27 contains the ranking.

TABLE 27: RESPONDENTS' EXPECTATIONS
FROM A UNIVERSITY DEGREE

Expectations	Percentage Distribution of Respondents Over the Rank Positions				
	1st	2nd	3rd	4th	5th
higher income	10	25	(29)	27	9
higher prestige	8	14	23	(23)	32
more and better opportunities to find employment	(60)	20	10	5	4
more interesting and satisfying work	17	(30)	18	22	13
easier life	5	10	20	23	(43)

○ modes: most frequently indicated rank positions
← denotes the clear tendencies of preference

The overall ranking does not establish a very determined pattern of preferences on which the majority of students could agree, but it reveals some tendencies. The concern with employment is a rather clearcut first concern. This supports the observations made about the employment considerations within the context of market influences. The expectations of an "easier life" are clearly relegated to the lower rank positions. Likewise, the expectation of higher prestige does not take priority,

13 QUESTION 18:

Rank the advantages of a University degree
according to their importance to you !

mark the most important with (1)
the next most important with (2)
and so on for all 5 items

higher income ○
higher prestige ○
more and better opportunities to find employment ○
more interesting and satisfying work ○
easier life ○

but is in fact more heavily distributed towards the lower rank position. The rather indetermined distribution of some of the expectations, warrants a more discriminatory analysis. Within the context of the channeling process it is of interest to discern whether there are different ranking patterns among the students admitted to the different faculties.

In TABLE 28, the first and second rank positions are accumulated and taken as an indication of preference. The emerging pattern of students in each faculty is compared with the over-all ranking of all new students.

TABLE 28: FIELD OF STUDY AND EXPECTATIONS
FROM A DEGREE

Faculties	Ranking* of Expectations by the Respondents Admitted into Each Faculty				
	Higher Income	Higher Prestige	Better Employment Chances	More Satisfying Work	Easier Life
	1st and 2nd rank positions only (cumulated %)				
Arts	30	23	80	47	19
Economics & Admin.	41	20	82	45	12
Agriculture	34	16	82	53	16
Science	49	19	79	47	14
Medicine	36	25	77	52	10
Engineering	38	25	81	49	7
Ranking by all new students	35	22	80	47	15

* A complete Table of Rankings is contained in APPENDIX B

Again, expectations of better employment chances are of uniformly foremost importance to respondents in all faculties. Expectations of more interesting and satisfying work are within the same realm of consideration and are the second most important and rather evenly distributed expectation. Except that a slightly larger number of medical students have ranked it as their foremost expectation reflecting perhaps a trace of the proverbial vocational calling of the medical profession.

Expectations of higher income also show very little variation between the students admitted to the different faculties. As was previously pointed out, in TABLE 28, career-choices are not significantly related to optimistic assessments of earnings. For instance, the earnings of teachers are unanimously ranked at the bottom of the scale; nevertheless, 27.1 percent of the respondents foresee a teaching career.

Expectations of higher prestige seem to be important for only 20 percent of the respondents and they distribute rather uniformly among the various faculties. Additional information on prestige ranking in relation to career-choices is available and warrants an interpretation. In TABLE 29, the prestige ranking of those students who chose a particular career is compared with the overall prestige ranking of all students. It appears that many more of those who chose a particular career also rank this career higher in terms of prestige. It is impossible to separate cause and effect and to determine whether students chose the career because of high prestige or whether they tended to attribute higher prestige because they chose the particular career. A possible explanation is that some students ranked prestige from their personal points of view; in which case any one of the listed professions involved a prestige gain, particularly for those of a lower status-origin. Nevertheless, when ranked in relation to other concerns, such as: employment, work-satisfaction, and income, the expectation of higher prestige assumes a smaller role.

TABLE 29: PRESTIGE RANKING AND CAREER-CHOICES

Career Choices	Prestige Ranking *			
			By those Respondents who chose the careers	By all Respondents
	No. of Respondents	%	1st and 2nd rank positions only (cumulated %)	1st and 2nd rank positions only (cumulated %)
engineers	166	8.3	38	22
high-level govern- ment administrator	427	21.3	38	30
business executive	304	15.2	20	12
secondary school teacher	544	27.1	8	3
university lecturer	271	13.5	42	29
medical doctor	113	5.6	70	49
scientist	167	8.3	33	24

The notion of the expectation of an "easier life" is difficult to interpret and was mainly included in the question to increase the range of different options. It is interesting to note that the number of respondents for whom the expectations of an easier life is important decreases as the degree of difficulty of the faculty increases. Only very cautiously could this be interpreted as an indication that achievement-orientation is correlated to the difficulty of the study program chosen. (see TABLE 28)

Achievement-orientation in terms of the various expectations is only very indirectly related to the choice of faculty. From the perspective of the respondents any one of the specific expectations could be associated with the choice of his field of study. The expectations are relative and formed very much by the social milieu from which the student came and the educational,

motivational, attitudinal, inputs he received. It is, therefore, interesting to explore some of the social inputs into the forming of motivation and expectations. When economic status-origin is tabulated with the ranking of expectations as in TABLE 30, an interesting pattern emerges, testifying to the relationship between expectations and the milieu of each student.

TABLE 30: ECONOMIC STATUS-ORIGIN AND
EXPECTATIONS FROM A DEGREE

Father's Economic Status		Ranking of Expectations				
Categories* as in TABLE 21		Higher Income	Higher Prestige	Better Employment Chances	More Satisfying Work	Easier Life
		1st and 2nd rank positions only (cumulated %)				
1	high	74	38	57	38	25
2		42	22	81	46	10
3		37	21	82	45	15
4		34	20	82	52	13
5		34	23	79	46	19
6	low	29	23	81	50	18
All Students		35	22	80	47	15

* Categories 7 & 8 are eliminated in this Table

Significantly larger proportions of students from the lower economic status-origin rank prestige gains high. Likewise, the expectation of more interesting and satisfying work is ranked higher by students from lower economic status-origin. Expectations of higher income are more closely associated with higher economic status-origin. It could be cautiously interpreted that the new students of a lower status-origin strive

to achieve higher status while the students from families who already have higher status, focus their expectations on higher income.

Racial characteristics in Malaysia include a wide range of socio-cultural implications which warrants their very specialized research. To gauge achievement-orientation and correctly interpret the differences among racial groups, much more refined instruments than were used for the purpose of this research are required.

The data in TABLE 31 result from cross-tabulating race with expectations and reveal that a large majority of both racial categories have much in common in their ranking of expectations. There are no differences in the ranking of better employment chances, work satisfaction and prestige increase. A very curious result, however, is that a significantly larger portion of Malays give priority to the expectation of an easier life.

TABLE 31: RACE AND EXPECTATIONS
FROM A DEGREE

Race		Ranking of Expectations				
% of total	Higher Income	Higher Prestige	Better Employment Chances	More Satisfying Work	Easier Life	
	1st and 2nd rank positions only (cumulated %)					
Malay	28	22	80	49	22	
Non-Malay	42	22	81	47	9	
All Students	35	22	80	47	15	

It is hazardous to interpret this on the basis of this cursory survey which includes the racial variables only as one of many. First of all, the delineation of the categories of expectations is not precise. Thus, "easier life" is not mutually exclusive from "higher income", nor from "higher prestige". The category of "easier life" could have been interpreted by many respondents as a conglomeration of several of the listed expectations, and thus suggested an easy start to the ranking. Second, a significant number of respondents indicated career options which do not offer much in terms of most of the listed expectations. The teaching profession, for instance, is unanimously ranked low with regard to prestige and income and some of the aspirants to the teaching profession might have indicated a very realistic assessment by opting for an easier life. In any event, the absolute number of respondents who ranked their expectations of an easier life in the first and second positions amounts to only 100 and 200 new students, respectively. (See tabulation in QUESTION 18, APPENDIX B).

(a) Findings. The findings do not prove HYPOTHESIS II/3 that achievement-orientation as such is unevenly distributed among the students in the various fields of study.

The hypothesized differences among the new students admitted to the various faculties materialized only on an insignificant scale. Expectations of better employment chances and work satisfaction are rather uniformly distributed as are the expectations of higher income and prestige. There is only scant evidence that the expectation of an easier life becomes

more important for students admitted into the commonly perceived "easier" faculties.¹⁴

From the analysis it was found that when achievement-orientation is divided into five different expectations significant differences emerge with regard to the importance of each of these expectations among all the new students. Better employment chances is the most important achievement category, followed by work satisfaction and expectations of higher income. Prestige gains and an easier life are important goals for less than 20 percent of the respondents. At the same time it appears that the considerations of prestige gains are more directly involved in the individual career-choices.

Achievement-orientation and the expected gains must be seen in relation to the individual student's frame of reference, thus status-origin and race were taken into account. While most of the expectations remain rather evenly distributed, a significantly larger proportion of students of low status-origin ascribe importance to prestige gains while students of higher status-origin focus their achievement-orientation on higher income.

c. Activity Preference/Avoidance.

i. (HYPOTHESIS II/4).

Bias against certain activities has an effect on the choice of field of study.

Implied here is the frequently alleged notion that the

¹⁴For explanation of commonly perceived "easy" and "difficult" faculties, see p. 194 ff. and the tabulation for QUESTION 34, in APPENDIX B.

higher the educational attainment, the more removed the individual wants to be from all types of work rated lower on society's value scale. This is consistent with the desire to utilize education as an avenue to raise oneself from the milieu and circumstances considered less desirable, such as living in rural areas or small towns, or working in the local level of the government, etc. Social stratification is rather closely related to the type and place of work. It is, therefore, expected that the aspirants to higher education in Malaysia associate a rise in social standing through higher education, with a greater distance from what they consider inferior types of work and life-styles. In QUESTIONS 21 and 22,¹⁵ attempts were made to draw out the relevant information. Developing a scale ranging from preferred to avoided activities would have been too extensive an undertaking to fit into the context of this research. Instead, a number of combinations of types of work and living conditions were listed. These were assumed to rank low from the viewpoint of many educated Malaysians. The selection of the low ranking activities resulted from exploratory interviews with students, educators, administrators and the observations of several outsider-observers. The description and delineation of the activity-categories was not accurate enough to obtain more than nominal data. The questions were designed to gauge the

¹⁵QUESTIONS 21 and 22:

- | | |
|--|--|
| <p>21. If you had a choice to engage in the following activities for some length of time, which ones would you try to avoid?</p> | <p>22. For which reasons would you avoid some of the above activities?</p> |
|--|--|

The response categories are contained in TABLE 32. Full details are in APPENDICES A and B.

respondents' intuitive reaction to one or two key notions in each category, such as "teaching," "difficult living conditions" and "rural areas". The respondents could indicate several of the activities they would be inclined to avoid.

In TABLE 32, the responses are cross-tabulated with a number of the reasons for avoiding certain activities.

TABLE 32: REASONS FOR AVOIDING LESS DESIRABLE ACTIVITIES

(42.8% of all respondents would avoid one or more of the listed activities)

Types of Activities		does not require Higher Education	payment is too low	social status declines	life would be too uncomfortable
	% of respondents who would avoid activities	(in % of the respondents who would avoid particular activity)			
work requiring frequent contact with poor, uneducated people	9	27	15	16	42
governmental work on the local or district level	11	24	12	17	47
technical work in rural area or small town	15	16	10	15	59
managerial work in small town	12	21	11	20	48
scientific field-work under di- fficult conditions	31	10	7	13	70
teaching or instructing in small town or rural area	22	18	12	17	53
100		Add to more than 100% because respondents could indicate several activities			

A very significant observation is that 57.2 percent of all newly admitted students did not indicate a desire to avoid any of the listed activities.

This leaves us with some reason to cautiously conclude that at least part of this relatively large proportion, 57 percent, of the respondents have no particular aversion to the tasks commonly rated low. Perhaps, it is the idealism of youth. Maybe

full acculturation has not yet taken place at this phase of their lives and will happen in a later stage when the concerns about status, careers and life-styles become more important. Or, maybe the developmental spirit has taken root at least in the thinking of a portion of the new generation.

For several reasons, it is difficult to draw these inferences about the students' reasoning and the answers have to come from more specialized research. It must be noted that the Malaysian Government has become acutely aware of the phenomenon that the most qualified manpower and expertise concentrates at the center and on the top of organizations and institutions. The rural areas, the local level of government, the medium and the small-scale economic activities are in fact stripped of scarce resource of highly qualified manpower. The issue has been widely publicized and respondents might have been induced to reply to the questionnaire in line with official policy. The fact that the questionnaire was sent to them as part of the admission procedure might have caused some apprehension and induced many to choose a noncommittal reply in that they would not avoid any of the activities. Many respondents could have chosen to avoid communicating their opinion at all and simply have chosen the neutral option by stating that they would not avoid any of the listed activities.

The very few direct questions regarding a very complex socio-psychological syndrome of preferences cannot be expected to yield an explanation as to cause and effect. Especially since students might not be consciously aware or understand the underlying psychological causations. The only observation offered

in this context is that the more than half of the new students did not indicate an aversion to any of the listed types of activities. TABLE 33 on page 137 reveals that this portion does not vary significantly among the new students in the various fields of study. This leaves the analysis with the remaining portion of students, 42.8 percent, who made their preferences or aversions explicit.

As evidenced in TABLE 32, the frequency with which the various activities are disliked differs. The most frequently disliked activities are scientific field work and teaching in rural areas. The aversion to teaching was already made evident in a previous context. It is likely that many of the students who do not intend to opt for a teaching career are trying to avoid any involvement in teaching. In addition, the aspirants to a teaching career most likely would avoid being posted in rural areas. The frequently cited dislike for scientific field work is partly due to large numbers of students from the Arts and Economic Faculties considering such assignments outside the realm of their competence. Also relatively large percentages of students in other faculties would avoid this activity.

When gauging the different reasons for reluctance, a prominent feature is that the notion that "life would be too uncomfortable" was an often indicated reason. Admittedly, this is not very discriminatory information and could have served as a catch-all for respondents who could not think of more specific reasons. The fact remains that they answered the question rather than leave it blank indicating intuitive aversion, even though they might not have been able to determine it more accurately.

Another significant observation is that teaching in small towns seems to be consciously avoided because of all the listed reasons. For a substantial number of respondents the possible decline in their status is a reason to try to avoid the listed activities. This is consistent with previous observations that prestige considerations are involved in the choice of careers of the respondents.

The comparatively minor concern with remuneration is consistent with an earlier finding that students are on the whole not very well-informed about the scale of remuneration. Also very significant is the frequently indicated opinion that some of the listed activities do not require the qualifications of higher education. One of the implications is that it is difficult to attract the necessary expertise to development programs beyond a few urban growth centers and some preferred white collar jobs if the young and better educated generation insists on avoiding the necessary involvement in the rural areas where the levels of government are lower and the frontier conditions less comfortable.

The second part of the research hypothesis focuses on the question of whether the aversion to lowly ranked activities is in any way associated with the chosen field of study. TABLE 33 shows the percentage of new students in each faculty who would avoid particular activities.

TABLE 33: AVERSION AGAINST ACTIVITIES
AND CHOICE OF FACULTY

Types of Activities		Faculties					
		Arts	Economics & Admin.	Agriculture	Science	Medicine	Engineering
in % of all respondents who would avoid activities		(in % of the respondents from each Faculty who would avoid activities)					
work requiring frequent contact with poor and uneducated people	9	10	7	(14)	25	9	10
governmental work on the local or district level	11	9	8	(14)	18	11	14
technical work in rural area or small town	15	15	15	(10)	15	15	(18)
managerial work in small town	12	10	10	(17)	15	12	19
scientific field-work under difficult conditions	31	15	25	(10)	(21)	22	13
teaching or instructing in small town or rural area	22	(15)	23	(35)	(19)	30	26
	100%	100%	100%	100%	100%	100%	100%
% of respondents from each Faculty who would avoid one or more of the listed activities		40	43	50	45	47	45
Total number of newly admitted students		869	503	44	261	165	162

○ Unlikely activity for graduates from the particular faculty
 ○ Significant observation

Several of the entries are irrelevant because they result from students avoiding some activities which would clearly fall outside their fields of study, e.g. technical work in rural areas is an unlikely task for students in the Arts Faculty. These entries have been crossed out and can be disregarded.

(a) Findings. The circled entries in TABLE 33 indicate that high percentages of respondents want to avoid just those activities in which they are most needed. The case of the Faculty of Agriculture stands out in that 50 percent of the student body has an aversion to one or several of the activities for which their studies are thought to prepare them.

The data also reveals that there are indeed differences between the faculties with regard to the frequencies with which attempts are made to avoid the less desirable activities. Taking the precarious nature of the data into consideration, it was

nevertheless decided to accept HYPOTHESIS II/4. However, it has to be kept in mind that the statement can only be made for roughly half of the respondents.

An important observation is that the degree of selectivity seems to increase towards the "more difficult" fields of study. Is this, simply due to the greater confidence these students have in the wider choice of employment opportunities? Or, conversely, do the arts and social science students foresee a more limited choice and therefore become less adamant about avoiding certain activities? In any event, the observation is contrary to the widespread opinion that particularly the students from the "easier faculties" are more exclusively concerned and oriented towards the high-ranking white collar jobs. There is evidence for just the opposite. It must be emphasized that only observations as to the choice of fields of study are being made. Causal relationships cannot be specified insofar as it is not possible to distinguish whether the activity preference or the aversion to activities is a determinant in decision-making about the fields of study and careers.

C. Effects of the Pattern and Content of Secondary Education in the Channeling Process

It is to be expected that secondary education has an overwhelming and very direct effect on the channeling of students into the fields of study at the university. It plays the most immediate role in preparing students for higher education. In earlier Chapters the methods and content of the educational process were described. It became apparent that at the time of advancing from Form IV to Form V of the Comprehensive Secondary Schools the pupil

was either channeled into the "science-stream" or the "arts-stream", or else was sifted out of the strictly academic mainstream, although he could continue in vocational schools. The streaming into the arts or science-oriented curriculum subsequently narrows the choice of field of study at the university. The arts-stream pupil is restricted to the choice of entering either the Arts Faculty or the Faculty of Economics and Administration. The science-stream pupil can elect among the Faculties of Science, Medicine, Engineering and Agriculture. However, since each of these faculties has its own specific requirements, the alternatives open to the individual applicant depend very much on what specific subjects were emphasized in the curriculum at his school and his performance in the examination at the end of his secondary schooling. The situation need not necessarily be of particular concern, since specialized educational inputs are common practice. Of concern, however, is the fact that the streaming of secondary pupils results in a quantitatively unbalanced pattern of applications and admissions to the different faculties at the institutions of higher education.

The University maintains that the present undersupply to the scientific and technological fields of study results from the fact that there are not enough qualified applicants for these fields of study. Some observers, and critics of the University indicate that the high admission standards are to blame since there are numerically enough science-stream school-leavers to improve the balance between the science-oriented and liberal arts faculties. A comparison of the number of applicants and

the number of actual admissions reveal the fact that 85 percent of all applicants are admitted. This does not leave much room for large numbers allegedly being turned away by the science-oriented faculties. On the other hand, it must be suspected that large numbers of students who do not feel they have a genuine chance for admission because of their weak educational background and/or unfavorable test results, do not apply. It appears further that the selection process channels pupils with the highest overall qualifications, that is, in terms of test results, into the science-stream. A result of this system could be that a relatively constant and small number of top performers from each generation of school-leavers meet the high admission criteria of the scientific and technological faculties at the University.

In Malaysia the situation is complicated by an ethnic dimension manifested by unequal access and/or unequal demand for the two principal streams of secondary education--science and arts orientation. Several factors contribute to the fact that Malays are proportionally under-represented in the science-stream of secondary education and even more so in the science-based faculties of higher education.

At the time the aptitudes of the present applicants were shaped; that is, 10-12 years ago, the rural schools were much more disadvantaged in the effective teaching of science and mathematics-based subjects. Since a large proportion of the Malay youth attended rural and small-town schools, the development of these aptitudes was neglected to a larger extent. The cultural-social traditions and psychological make-up of Malay culture and

and life-styles did not put any emphasis on scientific or technological knowledge and application. Thus, the Malay youth may not be inspired, persuaded or motivated by their social and cultural environment to acquire science and mathematics-based knowledge. Many Malay parents who now inspire their children toward educational achievement belong to a specific elite group, i.e., the families with Malay aristocratic ties and the more prominent Malay administrators and politicians who hold a large share of the political power, as well as a large share of the governmental machinery. These administrators were products of a British-style of education and training; based on education in the humanities, and geared to producing the gentlemanly-generalist-administrator. Since it is suspected that the educational background and aspirations of the parents and elders have a perpetuating effect upon the young, the professional preferences of the young are often shaped after the pattern set by their parents in the past.

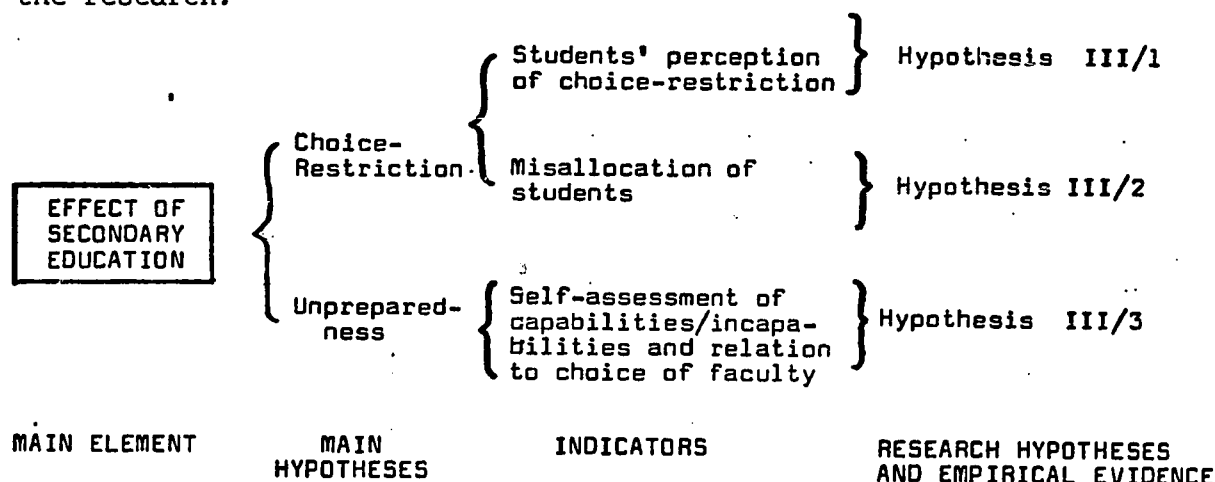
The empirical assessment of the influence which secondary education and especially streaming had on the choice of field of study is hampered by several shortcomings within this study. First, the questionnaire solicited responses only from successful applicants who were already admitted and allocated to the fields of study. On the whole, these respondents might consider themselves lucky enough to have been admitted to any faculty and have had no reason to think about alternatives beyond their immediate reach. Second, when their decisions were made three years ago at the age of sixteen, as to streaming either in the arts or the science curriculum, the aspirants did

not necessarily engage in conscious long-range decision-making; the process may have been somewhat automatic. Suffering from extreme anxiety at each stage because of the possibility of being sifted out of the academic process, they may not have attached great significance to the long-run implications of the decision that was being made.

The researcher's attempt to obtain information is limited to two aspects--"perception of choice-restriction" and "perception unpreparedness". These aspects are seen as indicators as to what kind of considerations were consciously made by the student. An assessment of how many students would repeat the pattern or make a different decision, given the circumstance, might provide some insight into whether students are so completely conditioned by being schooled in the arts-stream that they do not conceive of possible alternatives, or whether they now realize the restrictions under which they completed their secondary schooling.

With regard to "perceived unpreparedness", in certain science and mathematics-based areas of knowledge, a significant number of students indicated that they recognized the limitations imposed upon them by their unbalanced curriculum. If in a significant number of cases unpreparedness guided students' choices so as to avoid the fields of study with more science content, it would become apparent that students' interests and inclinations were actively obstructed by the course of secondary education. One could infer the extent to which the dislocation and distortions must have occurred during secondary schooling for a significant number of pupils.

The following chart schematizes the organization of the research.



From the foregoing Chapters, it became clear that the individual student aspiring to higher education is severely restricted in his choice as to the field of study. The streaming into the arts or science-stream during the last three years of secondary schooling narrowed his choice to either the humanities and social sciences or the range of technological and scientific fields. Can it be expected that these new entrants into higher education seriously considered alternatives that did not in reality exist for them, for instance, seeking admission into the Physics Department if their schooling emphasized the humanities? It is possible that the schooling in the respective streams resulted in such thorough conditioning that

the students quite naturally accepted the particular type of higher education that was applicable to them.

A set of hypotheses is advanced, however, to test whether the newly-admitted students consciously perceived of the restrictions placed upon them by their secondary schooling. That portion of the newly-admitted students who consciously evaluated their opportunities and perceived a restriction through their previous streaming into the science or arts-stream, will be rather readily assessed by QUESTION 25.¹⁶

According to TABLE 34, 22.5 percent of the students would not choose the same stream again. Of this group, 91.5 percent came through the arts-stream and 67 percent of them were Malay. This is in itself a significant finding in that the schooling received did not condition these students to the extent that they readily accepted all the consequences,

TABLE 34: STUDENTS' DISSATISFACTION WITH
SCHOOLING BACKGROUND

% of Students who would not choose same stream again	% of which came through arts- stream	% of which are Malays
22.5	91.5	67%

¹⁶QUESTION 25:

If you could, would you choose the same stream again ?

yes ☐
no ☐

rather, subsequent considerations and new insights caused second thoughts. At the same time the educational system forced them to remain within a limited career-choice.

This documents the above HYPOTHESIS III/1 that there is indeed a significantly large proportion of students who feel that their choice was restricted. This is expressed by their dissatisfaction with having come through the arts-stream of schooling. The fact that 67 percent of them are Malay, supports earlier observations of the lack of emphasis, facilities and opportunities for a scientific and technological secondary education, particularly for the Malays.

b. Rigidities of Streaming and Misallocation of Students.

i. (HYPOTHESIS III/2).

Restrictive decision factors were consequential for a significant number of new entrants who were dissatisfied with their streaming.

It would be interesting to reconstruct the circumstances under which the "streaming" took place for each student. This is a complex task if we assume that not too many sixteen year old pupils were overly concerned about the streaming choice. As was pointed out earlier, the streaming may have involved very little active decision-making in many cases. Moreover, streaming may have been a minor consideration when the main objective was to simply stay in school. Therefore, those students who were content with their educational experience and the opportunities ahead of them would most likely not be aware of the circumstances leading to their present situation. On the

other hand, those students discontent with the restriction of their choices were probably better able to trace the factors that led to their predicament.

Through a series of exploratory interviews with pupils, students, educators and through pre-testing, seven possible decision-making inputs with regards to streaming were categorized in QUESTION 24.¹⁷

TABLE 35: DECISION-INPUTS FOR STREAMING
IN FORM V

Decision-inputs	total % of respondents	Malay	Non-Malay	the respondents who "would choose same stream again" cited as most important decision-input (in %)	the respondents who "would not choose same stream again" cited as most important decision-input (in %)
advice from parents, relatives and friends	1.4	46.4	53.6	1.3	1.8
grades and the examinations determined	34.1	56.1	43.9	30.4	46.5
interest and liking for the subjects	30.3	43.3	56.7	36.7	7.8
chosen stream prepares for intended career	18.2	36.6	61.4	21.3	6.9
it was due to chance	10.1	65.7	44.3	6.5	21.8
there were not enough places in the science stream	3.9	63.1	16.9	1.5	11.8
advice of teachers or other school officials	1.6	46.9	53.1	1.4	2.2
		χ^2 - Test Chi-Square 134.8, D.F. 7 significant at 0.001 level		χ^2 - Test: Chi-Square 463.000, D.F. 7 significant at 0.001 level	

¹⁷QUESTION 24: How did you get into the arts-stream or science-stream during your schooling?

Response Categories are contained in TABLE 35.

*In the pre-testing questionnaires a category for "don't know" and one for "other" was included, but only insignificant numbers of respondents categorized their responses as such. Hence, it was assumed that the seven categories represented such a comprehensive coverage of possible categories, that the last two categories were excluded in the final version of the questionnaire.

As TABLE 35 shows, neither the "advice of parents" nor the "advice from teachers" were strong factors with either the contented or discontented students. The other reasons quoted for the streaming choice differ significantly between the "contented" and the "discontented" students. A significant observation is that "grades", "limitations of places in the science-stream" and "chance" account for over 88 percent of the discontented students' choices. One could infer that these students were channelled by the rigidities or deficiencies of the system rather than guided by their own inclinations. The magnitude of all admitted students (22.5 percent) dissatisfied with their schooling background and the limited choice of study open to them, is very significant; especially in view of the fact that these students were expected to be pleased simply to have been admitted to the university and were not expected to have been critical. Obviously, the limitations and restrictions exerted by secondary schooling must have led to misallocations, mainly at the expense of the students who had an interest and could have developed their potential in the scientific-technological fields.

TABLE 35 also contains a breakdown of the decision factors with respect to race. It reveals that significantly more Malays were subjected to the restrictive factors such as "grades", "limited capacity of the science-stream" and "chance". At the same time, the Malays were to a significantly lesser extent guided by "interest" and "career considerations".

The foregoing supports HYPOTHESIS III/2 in that as many

as 80 percent of the students who were discontented with their streaming cite the negative and restrictive decision factors such as "chance", "unavailability of places in the science-stream" or "grades and examination results".

It can thus be concluded that there was a significantly large proportion of newly-admitted students whose choice of field¹⁸ of study seemed to have been restricted mainly through the streaming mechanism, and who were subsequently frustrated in pursuing their preferred course of study.

c. Students' Capabilities or Incapabilities in Certain Subjects.

i. (HYPOTHESIS III/3).

Perceived unpreparedness in certain subjects is a significant restrictive channeling factor.

It was mentioned in a different context that the individual student is likely to apply, quite rationally, to the faculty where his test-results meet the specific requirements in an optimal way. The special strength of a student in certain subjects seems to provide an inducing channeling factor; this can be assumed to be true not only of Malaysian students. Since the researcher could not analyze the examination-results¹⁸ of individual students in each subject and relate them to the

¹⁸For technical reasons it would not have been easy to process the examination results of large numbers of students at that time. Furthermore, it would have been necessary to ask that each student identify himself on the questionnaire, a measure that was thought to be of distinct disadvantage with respect to the other objectives of the Questionnaire. Or alternatively, self-reporting of the examination results could have been included in the questionnaires. The University Administration did not consider any of the methods favorably and it would have been impossible to retain cooperation.

admissions requirements of his chosen field of study, no direct evidence for this relationship can be produced. The Office of Admissions, which processes students' applications, testified to the correctness of the above assumption based on their experience with evaluating students' applications.

Of more significance in the context of this study is whether the channeling of students is subject to negative guidance factors, i.e., the avoidance of fields of study, because the students feel unprepared in certain subjects. It is conceivable that students could be equally well-prepared in several subjects, except for instance in mathematics or English and that their channeling depends to a significant extent on their capabilities in these bottleneck-subjects. Since the more objective data of test performance was not available, students' own judgment had to be relied on.

As a substitute measure the new students were asked in QUESTION 26¹⁹ to rank their "confidence in mastering the various subjects". This type of subjective assessment of students could be ambiguous. For instance, what would be the perspective from which students made these assessments? Would their judgment be based on their past performance or would it be biased by what they would like to study? Through follow-up interviews it was found that students invariably based their answers to QUESTION 26,

¹⁹QUESTION 26:

Rank the following subjects according to your confidence in mastering them:

mark the one in which you feel most confident with
mark the next best one with
and so on for all subjects listed

③
①
②
④

Bahasa Malaysia

English

Mathematics

Physics, Biology, Chemistry

Economics

☐
☐
☐
☐
☐























on their High School Certificate Examination results, thus a relatively standardized objective measure was obtained by QUESTION 26.


By cross-tabulating the ranking of each student with their chosen field of study, an assessment was made as to whether "perceived unpreparedness" was related to students' application to specific faculties. If this "perceived unpreparedness" in certain fields turned out to be associated with avoiding certain faculties, one could infer that such restrictive factors did indeed bear upon the channeling process. TABLE 36, contains an analysis of the self-assessed capabilities of students from the arts-stream who had to choose between the Arts and the Social Science Faculties.

The pattern of ranking of the students who applied to the Faculty of Economics and Administration and the Faculty of Arts is significantly different in four out of five subjects as the Chi-Square tests indicate. The differences can be more specifically tested through Binomial Tests of Significance.²⁰ The pattern of allocations shown in TABLE 36 suggests that specific capabilities or incapacabilities are related to students'

²⁰In these tests the percentage of respondents in each rank position, e.g., the percentage of students ranking their Malay language capabilities in the highest rank position, were compared as to whether they fell into the range of values that could be expected in a chance distribution. If the percentages of students fell outside the values calculated for a confidence interval at the 0.05 level, the proportion of students would be considered significantly different from a proportion achieved through chance.

**TABLE 36: ANALYSIS OF DIFFERENCES OF SELF-ASSESSED CAPABILITIES
OF ARTS-STREAM STUDENTS**

Subject	Faculty applied to	Distribution of rankings in absolute numbers and in % of Students who applied to FEA and the Faculty of Arts					Total number	
		1	2	3	4	5		
MALAY LANGUAGE	FEA ¹⁾		72 14				503	Chi-Square Test significant at 0.01
	Arts		106 12				869	
	Binomial Test ³⁾ at 0.05 level	signif.	not signif.	signif.	signif.	signif.		
ENGLISH LANGUAGE	FEA		155 31	119 24	68 14	17 3	503	Chi-Square Test
	Arts		310 36	233 27	119 14	40 5	869	significant at 0.01
	Binomial Test at 0.05 level	signif.	not signif.	not signif.	not signif.	not signif.		
MATHEMATICS	FEA			108 22	242 48		503	Chi-Square Test
	Arts			153 18	395 46		869	significant at 0.01
	Binomial Test at 0.05 level	signif.	signif.	not signif.	not signif.	signif.		
SCIENCES	FEA	2 0	9 0	24 5	70 14	378 79	503	Chi-Square Test
	Arts	3 0	9 1	50 6	133 16	639 77	869	not significant at 0.01
	Binomial Test at 0.05 level	not signif.	not signif.	not signif.	not signif.	not signif.		
ECONOMICS	FEA		196 39			8 2	503	Chi-Square Test
	Arts		372 43			15 2	869	significant at 0.01
	Binomial Test at 0.05 level	signif.	not signif.	signif.	signif.	not signif.		

 indicates a significantly smaller number than could be expected under proportionate distribution.

 indicates a significantly larger number than could be expected under proportionate distribution.

- 1) FEA stands for Faculty of Economics and Administration
- 2) Chi-Square was made with percentage of total number of students who applied to either FEA or Arts, altogether 1372.

opting for a particular field of study.



















The differences in the rankings of students' self-assessed competencies led to the following interpretations:

- (a) A large proportion of the applicants to the Faculty of Arts ranked the Malay language as their major capability. It can thus be inferred that confidence in mastering Malay was an "inducing factor" in the channeling to the Arts Faculty.
- (b) A significant number of students who applied to the Faculty of Economics and Administration ranked their capabilities in Malay rather low and for this group the Malay language could have constituted a "restrictive factor" in that they avoided the Faculty of Arts.
- (c) Highly rated English language capabilities were an "inducing factor" for admission into the Faculty of Economics. However, the numbers of students thus induced was not great. Over most of the rank positions, students were distributed without statistically significant differences.
- (d) Lack of capabilities in mathematics proved to be a very strong "restrictive factor" as it appeared that rather large numbers of students with low-ranked mathematical capabilities applied for the Faculty of Arts. But at the same time, mathematics also constituted an "inducing factor" in that a portion of students admitted to the Social Science Faculty ranked their mathematical capabilities rather high. However, the absolute number of students thus induced was small.
- (e) Capabilities in the science subjects were fairly evenly distributed over all rank positions. There was no significant difference between the distribution of capabilities of students who applied to either the Faculties of Economics and Administration or Arts. Science subjects did not seem to play a role as a channeling factor among the students from the arts-stream. For the most part they ranked their respective abilities low.
- (f) Capabilities in the economics-related subjects differed significantly in the highest ranks and in the third and fourth ranks suggesting that there was a fairly strong "inducing factor" influencing students to apply to the Faculty of Economics and Administration. At the same time there seemed to be a "restrictive" factor channeling students with weaker backgrounds in these subjects into the Faculty of Arts.








A similar analysis of the newly-admitted students from the science-stream as well as their respective ranking capabilities was undertaken. As indicated in TABLE 37, students who applied to the Faculties of Science, Engineering, Medicine and Agriculture ranked their capabilities in most of the subjects significantly differently. (The exception being the subject of economics.) In order to pinpoint more specifically the differences in self-assessed capabilities and how they are related to the distribution of students among the faculties, Binomial Tests of Significance were made. Any significant differences constituted reason to cautiously conclude that either inducing or restricting factors had a bearing on students' applications to be various faculties.

- (a) The self-assessed capabilities in the Malay language were fairly equally ranked by students applying to the four faculties; the only significant deviation being that a considerably larger share of the students applying to the Faculty of Agriculture ranked Malay either in the first position or in rather low positions. This may have reflected the ethnic grouping of students applying to the Faculty of Agriculture. Generally, it could be seen that capability in the Malay language was placed in the lower ranks. This trend pervaded the rank distribution of all students applying to the scientific and technological faculties. This was mainly due to ethnic differences, since the highest and lowest ranks reflected very closely the proportions of the ethnic grouping of Malays and non-Malays. It appeared that capability in Malay or the lack of it exerted major inducing or restricting influence on choices among scientific and technological faculties.
- (b) English language capabilities seemed to constitute an "inducing factor" for students admitted to the Medical Faculty. The low ranking of language capabilities, English as well as Malay, by the students admitted to the Faculty of Engineering was remarkable. English did not seem to exert a "restrictive force," nor did it constitute a strong "inducing force" other than in the case of the students applying to the Medical Faculty.

TABLE 37: ANALYSIS OF DIFFERENCES OF SELF-ASSESSED CAPABILITIES OF SCIENCE-STREAM STUDENTS



Subject	Faculty applied to	Distribution of rankings in absolute numbers and in % of Students who applied to the Faculties of Science, Engineering, Medicine, and Agriculture					Total number	
		1	2	3	4	5		
MALAY LANGUAGE	Science	20 8	21 8	37 14	105 40	78 30	261	Chi-Square Test significant at 0.01
	Engineering	12 7		18 11	71 44	57 35	162	
	Medicine	19 11	13 8	25 15	64 39	44 27	166	
	Agriculture		6 14	9 21		8 18	44	
	Tests for significant differences	signif.	signif.	not signif.	signif.	not signif.	633 total	
ENGLISH LANGUAGE	Science	37 14	34 13	105 40	64 25	21 8	261	Chi-Square Test significant at 0.01
	Engineering	14 9		72 44	49 30	14 9	162	
	Medicine			57 34	29 18	9 5	166	
	Agriculture	4 9			13 30	4 9	44	
	Tests for significant differences	signif.	signif.	signif.	not signif.	not signif.	633 total	
MATHEMATICS	Science		76 29	30 12	14 5	6 2	261	Chi-Square Test significant at 0.01
	Engineering		43 27				162	
	Medicine		60 36	29 18		8 5	166	
	Agriculture		13 30	9 20			44	
	Tests for significant differences	signif.	not signif.	signif.	signif.	signif.	633 total	

NATURAL
SCIENCES

	rank positions					
	1	2	3	4	5	
Science	69 26	122 47	46 18	19 7	5 2	261
Engineering	 31 19	 101 62	21 13	8 5	1 0	162
Medicine	 81 41	 53 32	29 18	13 8	3 2	166
Agriculture	 20 46	 6 14	9 21	 7 16	2 5	44
Tests for significant differences	signif.	signif.	not signif.	signif.	not signif.	633 total

Chi-Square¹⁾
Test
significant
at 0.01

ECONOMICS

	1	2	3	4	5	
Science	0 0	9 3	43 17	59 23	150 58	261
Engineering	0 0	2 1	 43 27	30 19	87 54	162
Medicine	2 1	4 2	25 15	34 21	101 61	166
Agriculture	1 2	 5 11	8 18	7 16	23 52	44
Tests for significant differences	not signif.	signif.	signif.	not signif.	not signif.	633 total

Chi-Square
Test
not
significant
at 0.01



indicates a significantly smaller number than could be expected under proportionate distribution.



indicates a significantly larger number than could be expected under proportionate distribution.

1) Chi-Square Tests were made with percentages of total number of Students who applied to either FEA or Arts, altogether 633.

- (c) Capabilities in mathematics seemed to have a strong bearing upon the channeling of students among the scientific and technological faculties. Ninety-two percent of students giving their mathematical capabilities a high ranking had applied to the Faculty of Engineering. Likewise, of the students admitted to the Faculty of Science 81 percent ranked their mathematical capabilities in the first two rank positions. Mathematics appeared to be a strong "inducing factor" for applicants to these two Faculties. Among the applicants to the Faculties of Medicine and Agriculture, the high ranking of mathematical capabilities was significantly less frequent. It could be inferred with caution that the lack of capabilities in mathematics acted as a "restricting factor" for students applying to the two Faculties, particularly those applying to the Faculty of Agriculture.
- (d) Capabilities in the sciences; biology, physics and chemistry, seemed to be significantly stronger among the applicants to the Faculties of Medicine and Agriculture. The percentages of applicants to the Science, Engineering, Medicine and Agriculture Faculties, who placed their capabilities in scientific subjects in the first rank position were 26 percent, 19 percent, 41 percent and 46 percent, respectively. Thus capabilities in the sciences were a rather strong "inducing factor" to channel applicants into the Faculties of Medicine and Agriculture. It is interesting to note that a significantly large number of applicants to the Faculty of Agriculture ranked their capabilities in the science subjects low. This leads to the cautious inference that the lack of a science background acted as a "restrictive factor" which might have been a reason for these applicants not having applied to any of the other three scientific/technological faculties. That is to say, the Faculty of Agriculture served as an area for students who did not have as much confidence in their science capabilities.
- (e) The students' preparation in economics and related subjects did not appear to be a major factor. The overall distribution was not significantly different from a proportionate distribution as tested at the 0.01 level. The only differences involving significant numbers of students pointed to the more highly-assessed capabilities in economics of students applying to the Faculties of Engineering and Agriculture. The preparation in this area of knowledge did not seem to constitute a significant "inducing" or "restricting factor" among the applicants from the science-stream.

- (a) Findings. With regards to HYPOTHESIS III/3 that
perceived unpreparedness in certain subjects is
a significant restrictive channeling factor

it can be confirmed that several of the specific areas of knowledge seemed to have a significant influence on the pattern of application to the various faculties. The analysis conducted can only yield crude indicators that the educational inputs and the students' capabilities bear upon the distribution of students among the faculties. There is no conclusive evidence that either high or low self-assessment of capabilities in any one subject is in fact the sole decision-factor for applying to a particular faculty. In many cases students applied to a field of study despite their low-ranked capabilities from their respective educational backgrounds. This serves as evidence that there must be factors other than capabilities in areas of knowledge, such as administrative incentives like scholarships tied to specific fields of study, influencing their decisions. In other cases, there may be a multitude of reasons from within the student's individual perspective which are very difficult to assess. The fact remains, however, that in a large number of cases the positively or negatively assessed capabilities in certain fields of knowledge are closely related to the students' avoiding a particular faculty.

d. Conclusions of Research on Effects of
Secondary Education.

A significant proportion of students, that is, 22.5 percent, perceive the margin of their choice as restricted through secondary school streaming which they would not repeat given the opportunity. Almost exclusively the arts-stream pupils, a

large percentage of them Malays, are affected by what could be termed misallocations as far as their interests and inclinations are concerned. It is significant that a relatively large number of students become conscious of this in spite of being conditioned through their education. It is assumed that qualitatively inadequate schooling and quantitatively limited training in the science and technological areas are major causes for the unused potential among pupils.

This hypothesis is documented by the observation that restrictive factors played a major role in the streaming of the students now dissatisfied with the choice open to them at the University. Even among the contented new students a large proportion quote restrictive factors as having been decisive in their streaming. Active and conscious decision-making about the content of their secondary schooling seems to play a relatively small role. The channeling into various fields of study is in many cases geared to the capabilities of applicants in crucial subjects, the result being that the mathematics and language capabilities act as constraints in allocating new students to the under-supplied fields of study.

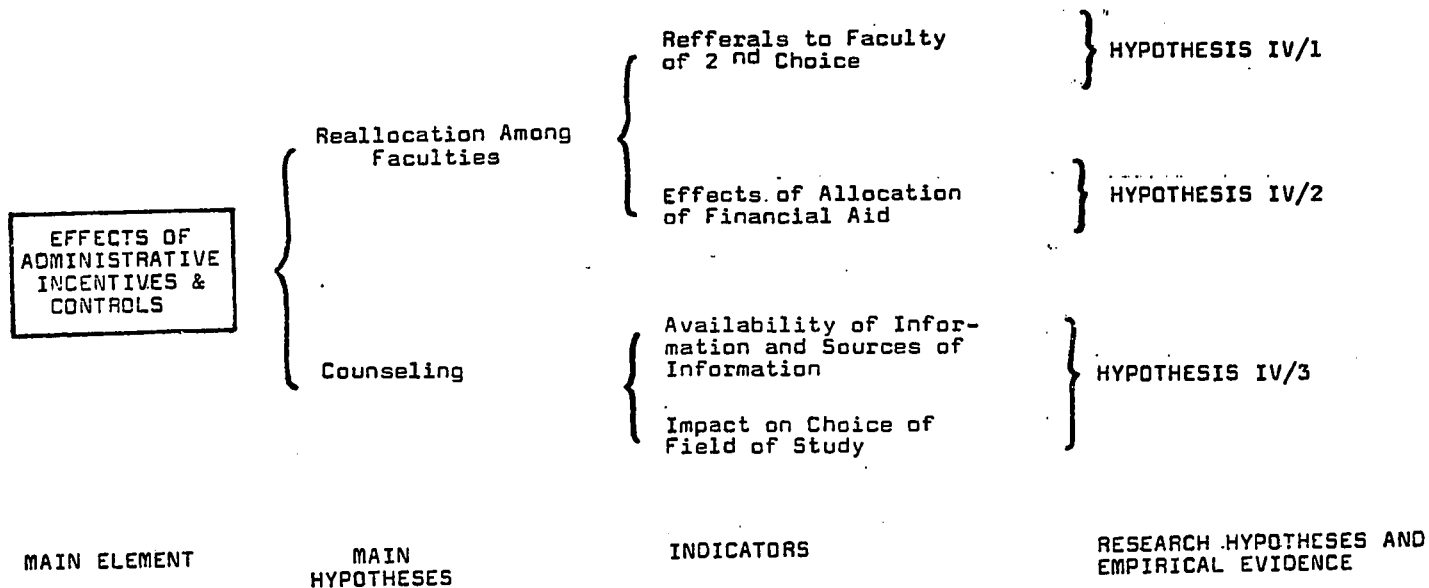
A great number of the causes of the imbalances at the institutions of higher education can indeed be traced to the pattern and content of secondary schooling which does not enable enough students to exert a wider choice with regard to the fields of study when entering a university.

D. Effects of Administrative Incentives and Controls in the Channeling Process

At the time when the school-leavers enter into contact with the agencies concerned with higher education, several incentives and controls are conceivable. The extent of their application and effectiveness is the subject of the following empirical analysis.

First of all, applicatns can be allocated to faculties other than the faculty of their first choice in order to control the flow of students among the different fields of study. Second, financial inducement in the form of scholarships can be dispersed in such a way that it affects the number of students in the various fields of study. Third, guidance through personal counseling, or in a less direct manner through dissemination of appropriate information, can be applied in a purposive fashion.

Within the present educational and institutional framework, there is but a narrow margin in which such incentives or controls could be effective and could supersede the rigidities already discussed. On the other hand, if these points of leverage are not fully utilized, it serves as an indication that the composition of higher education is not subject to a purposive policy but passively accommodates public demand. Further, it can be inferred that the pressures exercised by public demand and by the intellectual and political leadership center with far greater intensity upon the humanistic orientation of education. The respective hypotheses and their researchable components are shown as follows:



1. Research on the Effects of Administrative Incentives and Controls, Hypotheses IV/1 - IV/3

a. Re-allocation Among Faculties.

i. (HYPOTHESIS IV/1).

No significant re-allocation of applicants is affected between the faculties.

An effective way to control the allocation of students between the faculties would be to refer students to the faculty they list as second choice, or any other faculty in which their

qualifications would be lower but still conform to the minimum requirements if the desired number of applicants has been allocated to the field listed as first choice. TABLE 38 reveals that referrals to the faculty of second choice take place only on a small scale.

TABLE 38: REALLOCATIONS OF APPLICANTS BETWEEN FACULTIES

Faculties	Faculty applied to	Faculty admitted	re-allocated between liberal arts Faculties		re - allocated between science and technology Faculties
			in % of total number of respondents (2005)		
Economics & Administration	25.1	21.0	- 4.1	} 4.1	
Arts	43.3	47.2	+ 4.1		
Science	13.0	17.2			+ 4.2
Engineering	8.1	7.5			- 0.6
Medical	8.3	3.5			- 4.8
Agriculture	2.2	3.4			+ 1.2
					5.4

This pattern of re-allocating applicants is not in all cases consistent with the aim of expanding the faculties for whose output there is a greater demand. Of the applicants to the Medical Faculty 4.8 percent were reallocated largely to the Science Faculty and to the Faculty of Agriculture. The Faculty of Arts received 4.1 percent more students at the expense of the Faculty of Economics and Administration. Between the faculties of sciences and technology only 5.4 percent of all newly-admitted students were re-allocated and within the humanities only 4.1 percent were affected. Even though the small number of referrals is already surprising, it is more noteworthy that the few referrals made are contrary to what one would expect if educational policies consistent with manpower demands were considered.

b. Scholarship Allocation.

i. (HYPOTHESIS IV/2).

Scholarships have no significant effect on the allocation of students among fields of study.

Scholarships could be utilized as instruments to channel students into high-priority fields of study. The Government is well aware of the effectiveness of financial aid as an inducing and controlling instrument of educational policy. All applicants holding scholarships and/or bursaries have to be admitted into institutions of higher education if they fulfill the minimum requirements. The scholarship-awards are made during the last school year (Upper Form VI) on the basis of past performance and in anticipation of favorable test results in the final year. Disbursement of the scholarship is made only after the result of the final examination is known.

The question to be examined is whether scholarship-awards are used on any significant scale to channel students into fields of study which presently receive comparatively smaller portions of the student-intake. QUESTION 30 was intended to identify the recipients of scholarships in order to relate this fact to other characteristics.

TABLE 39 indicates that 50.9 percent of the admitted students received financial aid but only 32.9 percent of them had their financial aid tied to a particular field of study.

By comparing the distribution of "tied" and "untied" scholarships in TABLE 39 (columns 3 and 4), it seems that untied financial aid has very little impact on inducing students into the Faculties of Science, Engineering and Medicine.

Tied financial aid in comparison does seem to be given to significant numbers of applicants in the Faculties of Science, Engineering, Medicine and Agriculture. At the same time it is surprising that a large proportion of applicants to the Faculty of Arts are supported by financial aid tied to their entering the Faculty of Arts. One must conclude, on the basis of this data, that the policies for financial aid are not entirely consistent with manpower needs.

TABLE 39: STUDENT-INTAKE AND ALLOCATION
OF SCHOLARSHIPS AMONG FACULTIES

Faculty	Intake of each Faculty (% of total 71/72 intake of the University)	% of intake into each Faculty who received:		
	1	no financial aid 2	untied financial* aid 3	tied financial** aid 4
Economics & Administration	21.0	58.0	16.8	25.2
Arts	47.2	33.8	27.2	38.9
Science	17.2	56.1	7.1	36.1
Engineering	7.5	73.4	7.8	18.8
Medicine	3.5	60.4	7.5	32.1
Agriculture	3.4	36.6	17.1	49.9
% of total number of respondents	100.0	49.1	18.0	32.9

* financial aid not tied to a particular field of study

**financial aid tied to a particular field of study

When the data is analyzed with regard to racial composition it appears that financial aid is used to affect the racial balance of the overall student body; that is to enable Malays to enter into higher education. TABLE 40, reveals that 72.4 percent of all recipients of aid were Malays as compared to 27.6 percent for non-Malays.

At the same time, the data in TABLE 40 show that the racial composition of the recipients of financial aid is significantly different from the racial composition of the student intake in each faculty. Malays are heavily favored with scholarships in the Liberal Arts Faculties (Arts and Economics). In contrast, the percentages of Malay scholarship-holders in the Science and Engineering Faculties are very low and these two faculties have the small portion of Malay student intakes.

TABLE 40: RACIAL COMPOSITION OF TOTAL STUDENT BODY AND RECIPIENTS OF SCHOLARSHIPS IN EACH FACULTY

Faculties	% of total	Racial breakdown of Students admitted into the various Faculties		Racial breakdown of Recipients of Scholarships in the various Faculties*	
		Malay	Non-Malay	Malay	Non-Malay
Economics & Administration	21.0	54.7	54.3	74.4	25.6
Arts	47.2	78.6	21.4	86.9	13.1
Science	17.2	14.5	85.5	22.0	78.0
Engineering	7.5	9.1	90.9	32.3	67.7
Medicine	3.5	23.3	76.7	47.2	52.8
Agriculture	3.4	57.2	42.8	70.8	29.2
% of total # of respondent	100.0	50.7	49.3	72.4	27.6

*Scholarship include here all types of financial aid, tied or untied.

In the Medical Faculty the Malay scholarship holders are almost equally represented with the non-Malay scholarship holders, and in the Faculty of Agriculture, Malays are heavily favored again. This leads one to conclude that financial aid, as disbursed in the academic year 1971/72, seems to reinforce the channeling of Malays into the Liberal Arts Faculties. At the same time, scholarships seem to be utilized to enable larger numbers of Malay students to enter into the Faculties of Medicine and Agriculture. The Faculties of Science and Engineering, however, already severely racially unbalanced, also had relatively few Malays supported by financial aid.

With regard to HYPOTHESIS IV/2, one must assume that the allocation of financial aid has some effect on the channeling of applicants into the undersupplied fields of study. There are cases in which financial aid is given on the condition that a student enters one of the four scientific or technological fields of study. Out of these cases, some might not have entered these faculties without this financial inducement. On the other hand, the percentage of these cases, out of the total number of new students, is small and smallest in the Faculties of Engineering and Medicine, whose graduates are in short supply on the labor market. In comparison, the percentage of aided students in the Faculties of Arts and Economics and Administration are much higher; the highest being the Arts Faculty and curiously there is also a relatively high percentage of aid tied to entering this faculty.

On the whole, the instrument of financial aid seems to have a much stronger effect on the racial composition of the student body. It seems that financial aid is indeed utilized in the first instance to affect racial balance.

c. Counseling and Availability of Information for High School Pupils.

i. (HYPOTHESIS IV/3).

Counseling and availability of information has no significant effect on the channeling of students into the different faculties.

As was mentioned earlier, there are no formal and official provisions for counseling large numbers of aspirants to higher education about the University and its study programs, nor about careers and opportunities. Thus it is not surprising that TABLE 41, based on QUESTION 36,²¹ shows that only a very small percentage of applicants received "official counseling". Institutionalized counseling, however, is not the only, and not necessarily the most effective way of disseminating information for the benefit of pupils' career orientation.

²¹QUESTION 36:

If you received any of the above information,*
Indicate the most important source you
received it from !

[Indicate one or several by marking the boxes <input checked="" type="checkbox"/>]	Information received from University prior to application	<input type="checkbox"/>
	Information from teachers or through school	<input type="checkbox"/>
	Information from official counseling	<input type="checkbox"/>
	Information from relatives, friends	<input type="checkbox"/>
	unspecific hearsay	<input type="checkbox"/>

* Refers to information about fields of study and the University (detailed in QUESTION 35)

TABLE 41: SOURCES OF INFORMATION ABOUT
STUDY-PROGRAMS

Source of Information	% of Students who ¹⁾ indicated as source
University	18.4
Teachers, School	38.9
Counseling	3.6
Relatives, Friends	52.5
Hearsay	13.6
No Information ²⁾	16.3

1) According to the formulation of Question 36 respondents could indicate several sources, therefore % add to more than 100.

2) This percentage is consistent with 15.0% who indicated in QUESTION 35, that they had no information. It serves as indication of the consistency of responses.

In QUESTION 32,²² the applicants were to indicate the types of information they received from any official source, such as, Government departments, schools, etc. TABLE 42, shows that a significant percentage of the applicants have been exposed to official information (although not through institutionalized counseling). Between 40-60 percent of the respondents received information on either one or several of the types of information.

²²QUESTION 32:

Did you receive any official information, verbal or in print,
(from Government Departments, through your school, or Press)
on any of the following ?

(Indicate one or several by
marking the boxes ☒)

requirements for various fields of study ☐

chances of admission at various Faculties ☐

availability of various scholarships ☐

employment opportunities ☐

the Government's aims and policies concerning Higher Education ☐

TABLE 42: AVAILABILITY OF INFORMATION
FROM OFFICIAL SOURCES

Types of Information	% of Respondents who had obtained Information ¹
Requirements for Entry into various Faculties	55.9
Chances of Admission into the various Faculties	40.0
Availability of Financial Aid	46.2
Employment Opportunities	42.5
Government Policies regarding Higher Education	39.5

1) According to Question 32, respondents could indicate several types of information, therefore percentages add to more than 100.

In the context of HYPOTHESIS IV/3, evidence is sought on what impact the available information had on students' decision-making. QUESTION 33,²³ gave the respondents four options in classifying their reactions to the information, the results of which are shown in TABLE 43. It is significant to note that a rather large percentage, namely, 37 percent of the respondents contend that their choice of field of study was not at all influenced by the available information. Another large group--30 percent--merely had their choice reinforced. Only 5 percent of the respondents made changes and 21.5 percent reached their decision on the basis of the information. Thus altogether only 26.5 percent of the respondents

²³QUESTION 33:

If you received any of the above information how
did it influence your choice of field of study?

(Indicate by marking one box)

reinforced your choice of field of study	<input type="checkbox"/>
made you change your field of study	<input type="checkbox"/>
had no influence on your choice	<input type="checkbox"/>
you chose the Faculty on the basis of the information	<input type="checkbox"/>

TABLE 43: EFFECTS OF INFORMATION ON
CHOICE OF FIELD OF STUDY

Reaction to Information	% of Respondents who indicated
reinforced respondents' choice of field of study	30.5
made respondents change field of study	5.0
had no influence on respondents' choice	37.1
field of study was chosen on the basis of the information	21.5

utilized official information as an important decision-making input.

Responses to QUESTION 32 measured at the same time the degree to which respondents were concerned with the various kinds of information, assuming that the conscious intake and evaluation of bits of information would only take place if there is a concerned receiver.

With regard to HYPOTHESIS IV/3, we can conclude that a significant portion of the applicants were indeed exposed and receptive to information which could be provided by counseling, but is presently disseminated or sought out through a multitude of channels. It cannot be indicated, however, what effect the decision-inputs had on the channeling of students into the different fields of study. There is only very indirect evidence to the effect that only 26.5 percent of the applicants were induced to change their previously chosen fields of study or made their decision on the basis of the information.

Further, it is significant to note that a substantial portion of students is neither reached by the particular kind of information, nor do they consider it an important decision-input.

d. Conclusions of Research on Administrative Incentives and Controls.

In the foregoing context evidence was sought on whether the channeling of students was affected by administrative measures of allocation, the disbursement of financial aid, or counseling and dissemination of information. The margin by which these instruments can influence students' choices is limited. But findings to the effect that this narrow margin was neither utilized at all nor used in concordance with declared goals are significant enough to be pointed out.

Administrative re-allocation of students to faculties of their second choice was on a very small scale and affected only 4.1 percent of the applicants to the Faculties of Arts and the Social Sciences and 5.4 percent of the applicants to the Faculties of Science and Engineering. The Arts Faculty gained through the re-allocations, as did the Faculties of Agriculture and Science. On the whole, it seems that the qualifications of the applicants with regard to the specific entry requirements of the faculties were the major consideration, not the supply of students to the fields of study in accordance with manpower demands.

Scholarship allocations appear to be made to achieve the goal of racial balance rather than proportioning the

number of students among the faculties. In some instances, scholarship allocations might have induced students to enter one of the four scientific and technological faculties. The numbers, however, were too small to have a significant effect on balancing the number of students. In other cases, financial aid seemed to support the prevailing preferences. Data on the decisions of the various State Scholarship Awards Committees or on the allocation of Federal Scholarships and Bursaries, were not available. The opinions of several interviewed members of such committees, varied. It was asserted by some that students in the scientific and technological concentrations were more favorably considered. Other sources maintained that the considerations as to the fields of study were relatively inconsequential.

Official counseling and information on requirements, admissions, scholarships, employment opportunities, and Government policies, seemed to be available to about half of the applicants. This information had a significant influence on the decisions of only 26.5 percent of these applicants. This indicates that for a vast majority of the applicants, other factors were decisive.

E. University-Influence on the Preferences for Fields of Study

There are three approaches along which the University can exert influence on manpower development in general, and skill composition, in particular.

The most direct and immediate leverage is given when

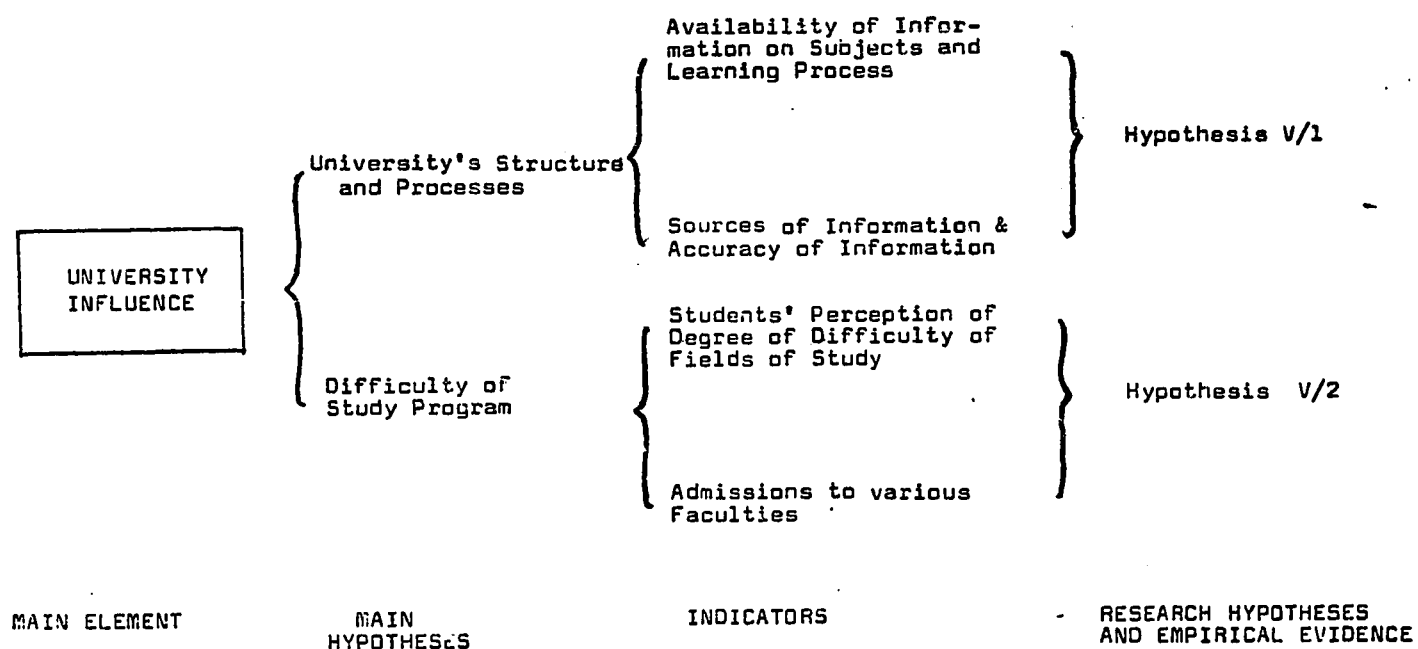
a generation of school-leavers seeks admission into the institutions of higher education. Admission policies, financial aid and counseling are the instruments. These were discussed in the previous section under "Administrative Incentives and Controls".

Another opportunity for influence exists during secondary education and could be exerted upon the youth threading their way into the higher levels of secondary education, by the supply of information and advice on career aims and corresponding fields of study. A large-scale rebalancing between the humanistic and the scientific-technological content of education could only be achieved, however, if the entire school system and the secondary school system in particular were enabled to re-orient their educational content, emphasis and method.

Higher education is intended as an institution preparing students for the functions of innovation. The dual significance of education is referred to again in this context. It enhances the capabilities of the individual and at the same time adds skills for the benefit of the societal system. The University as an institution in Malaysia is uniquely beset by the problems involved in finding its institutional identity and functions within the society. To many, the University is considered a new non-traditional avenue to status, influence and prosperity. Thus, the University is in danger of being affected by incoherent social forces and conflict. Even though the University is only one facet in such societal change-processes, it

could be a prominent change-agent exerting influence upon public opinion, on the politicians, and on the school-system, to affect changes of attitudes and preferences in the long-run. This requires public relations work from the University toward all segments and facets of society.

The contention is that the University does not effectively exhaust its influence on the preferences of the aspirants to higher education at the present time. In order to test this, evidence was sought on several indicators of students' perception:



1. Research on University Influence, Hypotheses
V/1 - V/2

a. Information on University Structure and
Processes, (HYPOTHESIS V/1).

Information on the University's educational structure and processes is now widespread and in a significant number of cases, it is inaccurate.

Dissemination of information throughout society is one way in which the University could attempt to influence the socio-political environment. It is also assumed that information, if available, has a direct impact upon the individual aspirant's perception, which in turn, is the basis for his decision-making. Testing either the effective influence upon public opinion, values and preferences, the effective influence upon the individuals' career decisions cannot be attempted in this context. But assessing the availability of relevant information, a prerequisite to rational decision-making, is intended.

QUESTION 35 was designed to elicit from respondents indications of whether they had obtained information on the "subject-content of the field of study" they had applied for, and on "the learning processes at the University level".

The tabulated results show that this type of information was obtained by a significantly smaller number of students, compared with the information on applications, admissions and the process of "getting into" the University, which was dealt with in the section under, "Administrative Incentives and Controls"). For a comparison see the tabulations for

QUESTIONS 32 and 35 in APPENDIX B. It is difficult to distinguish whether the information was actually unavailable, or whether the applicants were less interested in this particular information when their most immediate concern was to be admitted into the University. For the newly-admitted students who obtained information, an attempt was made to categorize the sources²⁴ through QUESTION 36.²⁵

TABLE 44 shows that a substantial number of applicants (29.1 percent) did not acknowledge that such information was obtained.²⁶ Another observation from the data is that all the sources contributed substantially to the students' base of information except the "official counseling". This is due to the fact that large-scale counseling of aspirants to higher education is presently not systematically undertaken.

²⁴Originally a scale of reliability was implied in the categorization, but after the findings related to HYPOTHESES I/2 and I/4, no assumptions as to reliability were made in this context. For difficulties in connection with isolating sources of information, see pp. 101.

²⁵QUESTION 36 is listed in the footnote on page 179.

²⁶Students who did not respond at all to the question are also counted in this group and it is regretted by the researcher that there were no provisions made in the questionnaire for a "no response" category to this question.

TABLE 44: AVAILABILITY OF INFORMATION ON SUBJECT-
CONTENT AND UNIVERSITY LEARNING PROCESSES
AND SOURCES OF INFORMATION

categories of information	% of respondents who received information	% of respondents who indicated as their sources:				
		18.4 University	38.9 Teachers, School	3.6 official Counseling	52.5 Relatives, Friends	13.6 Hearsay
subject-content of field of study	41.3	62.7	41.2	3.5	41.3	39.0
learning process at the University	29.0	11.1	33.8	2.5	35.3	35.7
both of the above*	13.8	10.1	21.3	2.2	21.7	17.3
none of the above information	29.1					

* this figure is doublecounted with the two preceding categories of information

If any pattern is discernible, it is that the University apparently has effectively disseminated information about the subject-content of the various fields of study, namely to 62.7 percent of the applicants. This information may very well have been extracted from the brochures and annual calendars listing the study programs for the various faculties and departments which the University distributes mainly to schools and thus to applicants who can have access to them through efforts of their own.

The observation that only 29 percent of the respondents recalled any information on the methods of learning and teaching is significant. In other words, information on the distinct characteristics of the learning process at institutions of higher education is relatively scant. Such information

was received to some extent. Thirty-three percent of those receiving it acquired it from teachers and schools, but 71 percent received it from relatives, friends and unspecified hearsay. Presumably some of the informal sources of information were acquaintances with previous study experiences. In general, this aspect of the learning process seemed to be of secondary interest to applicants.

QUESTION 37²⁷ was formulated in order to obtain a more objective assessment of what students knew about the University's departmentalization and how the fields of study related to the various professions. The responses were measured by a score. Twelve professions were given and the respondents were asked to match the listed faculties for study purposes with the appropriate listed professions. For some

²⁷QUESTION 37:

If someone wants to qualify for the professions listed below, which Faculty would one choose ?

choose from the Faculties: Economics and Administration
Arts
Medical
Science
Agriculture
Engineering

and write into the spaces below.

In some cases several different Faculties are possible.
Fill in as many as you can !

If someone wants to become an Accountant one would study at the Faculty of

Entomologist

Business Manager

Geologist

High-level Administrator
in the Ministry of Health

Agronomist

Biologist

Statistician

Surgeon

Secondary-school Teacher
Mathematics and Physics

Marketing Expert

of the professions, several faculties could be chosen. The highest score was obtained by respondents if they correctly matched all listed professions with faculties. For each erroneous match one point was deducted.²⁸

The tabulation for QUESTION 37 (APPENDIX B) shows the distribution of scores. The mode, median and arithmetic mean are at scores 9, 8, and 7, respectively. This is a rather poor outcome in view of the fact that 70 percent of the respondents did indicate that they had obtained the relevant information. Barring large-scale inconsistencies in the responses, it can be inferred that the information about the structure and processes at the University is not accurate.

Cross-tabulating the scores obtained through QUESTION 37 with the sources from which information was obtained elicited through QUESTION 36, it can be seen in TABLE 45 that

TABLE 45: ACCURACY OF INFORMATION ON THE RELATIONSHIPS BETWEEN FIELDS OF STUDY AND PROFESSIONS, AND SOURCES OF INFORMATION

Matching of Faculties and Professions, * measured in scores, (categorized)	% of respondents	% of respondents who indicated as their sources:				
		18.4% University	38.9% Teachers, Schools	3.6% official Counseling	52.5% Relatives, Friends	13.6% Hearsay
0 - 4	8 %	8.8	9.9	9.7	9.0	9.4
5 - 8	44 %	40.5	45.0	38.9	45.6	37.2
9 - 12	45 %	48.4	42.5	45.8	44.1	48.0
13 - 16	1 %	0.9	0.8	2.8	1.1	1.1

* for each correct matching 1 point;
for each incorrect matching 1 point deducted.

²⁸ The respective data are also shown in TABLE 40, columns 1 and 2.

the different sources of information do not have a significant influence upon the accuracy of the information. This is consistent with the findings related to HYPOTHESES I/2 and I/4 in which cases it was also shown that the sources of information were not related to the accuracy of information.

(a) Findings. With regard to HYPOTHESIS V/1, 70.3 percent of the respondents did have some information on either the structure or processes of the University thus proving that information was available. The University seemed to be more effective with its dissemination of information on subject-content of study programs than with its dissemination of information on the learning processes at the University. The latter information came from teachers and schools in 33.8 percent of the cases; but to a larger extent from the more unsystematic, personalized and subjective sources of information, e.g., relatives, friends and unspecified hearsay--71 percent of the cases. Generally the informal, personalized and subjective sources and channels of information seemed to prevail. Information on the fields of studies and how they relate to the various professions was quite inaccurate. But the source of information does not seem to have any bearing on the accuracy or inaccuracy of information.

The question arises as to how effectively the University can influence public opinion and the educational system as well as guide and persuade its aspirants into new patterns and processes of higher education, if the relevant information obtained by those affected is largely inaccurate and informal,

subjective sources with insights often based on past experiences are utilized.

b. Students' Perception of Degree of Difficulty
of the Various Fields of Study,
(HYPOTHESIS V/2).

The University has not been effective in countering the perception of the degree of difficulty of the various study programs and its effects upon the pattern of applications and admissions.

Under the circumstances in Malaysia, where a university degree is an important means for upward social mobility, there is the danger that obtaining a degree--whatever degree, in whatever field--can become the primary objective of those seeking higher education. The substance and method of the University could be endangered when trimmed to serve just this narrow and short-sighted goal. The healthy striving of the populace to improve their means could exert undue pressure on the University to seek shortcuts which could eventually downgrade the purpose of higher education.

The University as an institution of intellectual leadership in society has to safeguard its academic standards. The University of Malaya has defended this position against the vagaries of other claims and the emerging political and social demands. It is disturbing, however, to find empirical evidence that aspirants to higher education pursue study courses following the path of least resistance, i.e., the "easier fields of study", which are contrary to manpower requirements. The Liberal Arts Faculty, which ranks as the easiest, is also the one with disproportionately large numbers of students, compared to the number of students in the

(a) Findings. With regard to HYPOTHESIS V/2, the data seem to support the contention that the bulk of the students favored the path of least resistance. Those faculties rated as "easy" attracted the larger number of applicants. The University, being at the end of the educational pipeline, can do relatively little to affect a change in the preferences of the present generation of applicants. One avenue for change in the future might be to disseminate purposeful information as to the content and methods of study programs in the shunned areas of knowledge, in order to encourage more students to take the risks which they may presently over-estimate. Also, the study programs in the "difficult areas of study" could be made more flexible with regard to the length of study, and in the design of study programs, so that aspirants who judge themselves less prepared in a particular area of knowledge, can nevertheless enter into a study program in that field of study. In addition, the requirements, the curriculum, the degree of sophistication and intensity could be raised in the humanities and social sciences in order to diminish their image as "easy" fields of study.

The University in its role as an agent for change could bring its influence to bear on altering the outlook of future generations of university students. Most important in the long-run would be changing the emphasis throughout schooling, which is now biased in favor of what was ranked as the "easy" areas of knowledge.

VIII. THE INSTITUTIONS INVOLVED IN THE CHANNELING PROCESS AND THE LEVERAGE FOR CHANGE

The channeling process involves a multitude of institutions. Only a few aspects were researched by surveying students' perceptions and reactions. In the following discussion several of the major institutions will be pointed out. The discussion has a problem-oriented emphasis since it involves the instruments through which the channeling process can be influenced. No specific program of action is proposed, but some of the aspects suggest themselves as leverages for change. For no other purpose than facilitating systematic discussion, the variety of institutions will be divided into "constraining factors" and "policy-making and controlling institutions", according to the framework laid out in Chapter II.

A. Employment Structure

The employment structure is thought of as a constraining factor in the context of balancing the output of graduates in the different fields of study. When considering the present employment structure in industry, trade, government and the services, it appears that there are not many unfilled positions for which training at the University in science and technology are essential. The existing demand for scientists is largely restricted to science teachers. The demand for engineers is

confined to those using relatively unsophisticated work-place technology that probably does not require the complex knowledge acquired at the University. Graduates trained in management face the prospect of having to start on the lower rungs of an organizational hierarchy usually based upon seniority. All this adds up to career prospects that are not very exciting. On the other hand, for the graduates in the liberal arts, the discrepancy between desired employment and what can actually be expected is not too different. Many of the liberal arts students want to become teachers and there is a good chance that they will be able to do so. Another large segment of liberal arts students will be absorbed by the rapidly expanding government bureaucracy. The inherited British Civil Service ideal does indeed prescribe the administrators ought to come from a broadly-based liberal arts background. In fact, other professionals are still hampered from reaching the higher echelon of administrators, and find that they are almost barred from reaching the top echelon of administrators. Thus the governmental apparatus, an important source for employment of graduates actually favors the liberal arts student and hence distorts to some extent the skill composition that manpower-planners may expect when defining functions and educational backgrounds.

Industrial and commercial penetration has not yet reached a level where the increasing numbers of highly trained professionals are easily absorbed. This is the picture which presents itself to students when they realistically analyze

the employment structure. The empirical data on students' assessments of employment chances supports this.

There are three aspects of the employment structure that the school-leavers most likely do not take into account. First, the demand for technical and scientific personnel is rapidly increasing. The training of larger numbers of such professionals should not only be in response to existing demand, but could act as a stimulus to furthering the employment of such skills. Second, as the educational level rises, better educated people will be doing the jobs hitherto held by the poorly educated. The jobs thus upgraded will become more productive and also better paid. This upgrading process is a very important development, which results in all economic and social activities becoming more productive. It is not likely to occur as a rapid process of replacing the underqualified senior incumbents. Replacement will probably happen through natural attrition and a spillover process will set in when the preferred jobs are filled and become scarce, forcing people to move down on their job-preference scale and adapt to taking jobs that are something less than their first choice. For instance, when the top level civil service positions are filled, better educated people may begin to take jobs in production activities and the service sectors. This replacement process will only take place smoothly if the educated will adapt and move down their scale of socially determined job preferences. Third, the graduates in the professions should not count on employment by the few already existing large-scale enterprises but should develop enterprising and entrepreneurial initiative themselves.

This latter aspect is considered of such importance that it requires elaboration. The educational mix and the output of professionals in the different specializations should not be looked upon solely as being in response to manpower demands deus ex machina. This is often the emphasis of conventional manpower planning. It is important to see that the educational pattern--the educational output-mix--is an active ingredient in the process of changing the employment structure, incentive systems and cultural preferences. In the literature the "oversupply" of certain professions is often referred to as justified and beneficial. On the other hand, there are countries, such as India and Korea already experiencing an excessive oversupply of engineers, without having generated a large enough growth rate of employment opportunities for such professions. It is hypothesized here that this phenomenon is a result of failure to design and implement curricula that impart skills and instill attitudes needed in developing countries. The employment orientation of the graduates is entirely geared to competing for a few positions with existing large firms, public enterprises and the administration. Apart from the medical and law professions there is very little orientation toward self-employment or toward initiating new producing-, servicing- or trading-activities. Prestige aspirations are fulfilled by holding a degree--surrogate for a title--and being employed to earn a living in a gentlemanly way. The grueling task of initiating an enterprise from humble beginnings is beyond or better, beneath

most graduates' aspirations. Likewise, as Coombs¹ points out:

...too many of these often well-trained specialists are behind desks 'administering' instead of out building roads and schools, producing more food, improving public health. The chances are, also, that the pay is too high for 'administering' and 'too low' for 'doing things'.

Bringing about changes in the employment structure which are more amenable to absorbing graduates with more differentiated types of knowledge is only partly a question of investing in relevant types of activities and creating the workplaces. It is contended here that inducing changes in the aspirations and attitudes of the highly educated in order to make them more enterprising and self-reliant is no less important. It is argued that the latter aspects are even more fundamental in changing the occupational and employment structure. Education can be the major means of lessening the constraint of the prevailing traditional employment structure.

B. The Incentive System

The incentive system is not necessarily synchronized with the changing employment structure. In fact, it is symptomatic for societies in which rapid economic, social and cultural changes take place that discrepancies evolve. It should be borne in mind that the incentive system is comprised of not only tangible economic remuneration but also of the intangible rewards such as status, prestige, and influence. All these

¹Coombs, op. cit., pp. 89-90.

elements of the incentive system evolve and change at their own pace. Thus, monetary compensation does not in all instances correspond with the shortages and surpluses of skills. Teachers, for instance, rank relatively low on the pay scale for professional skills. There is no differentiation in the pay of urgently needed science and technical teachers and other teachers. In addition, there is no financial incentive for teachers to work in rural areas which are in greater need of them.

In some cases the prestige attached to certain occupations attracts a correspondingly high monetary market value. If the market is already near saturation with certain culturally preferred occupations, then the falling marginal and average remunerations are still compensated by social prestige. Incentive systems guided by such social and psychological mechanisms ingrained in the traditional past, are often in discord with the demand and supply for skills for modern economic and social functions.

The manpower demands exerted by industrial, organizational and service activities in developing countries did not arise through relatively slow, synchronized evolution, as in the older industrialized countries, but often sprang up suddenly, frequently introduced and promoted by outside interference. Thus it is conceivable and in many cases actually occurs, that there is little connection between the cultural values and the operational demands of newly developed activities. An incentive system fostering this lack of coordination can act as a constraint upon the educational processes.

In Malaysia some of these discrepancies are suspected to exist. The high prestige that is attached to governmental administrative positions, particularly by Malays, attracts a disproportionately greater share of the highly educated into government service. Furthermore, training for the Civil Service is heavily biased towards the humanistic orientation. Thus top administrative positions are most likely to be attained with a liberal arts background rather than through a professional career as an engineer or a scientist.

Traditional prejudices and concepts of status repel young people from the very types of work most needed for development drawing them instead to relatively less productive jobs.²

Some evidence that students judge the incentives by past experience and under an overlay of social evaluation, is contained in the different ranking of earnings of lawyers and administrators. For example, the aggregated ranking of students, places lawyers' incomes in second place whereby the experts rank them in fifth place. Students rank earnings of government administrators in seventh position--the experts in third.

The students' judgment might be based on the past experiences that lawyers dominated in many of the managerial and administrative positions. Employment practices are to be expected to change slowly from giving preference to the exclusively humanistically trained gentleman-administrator in the British tradition, to the functionally more specialized professional.

²Ibid., p. 79.

Guidance and advice by government agencies, who would be in possession of information on projected employment conditions and wage structure 5-10 years hence, is only received by a minority of students. For instance, respondents in the survey seemed to be rather pessimistic about the earnings and employment opportunities of scientists. The incentive system is a neglected aspect in the context of manpower planning and education. While it is important to fill the educational pipeline with the skills needed 20 years hence, it is equally important to adjust and synchronize the incentive system. This involves to some extent rather easy and inconsequential administrative procedures, but more often it requires changes of attitudes and preferences. Again, the educational system is the best suited instrument to overcome the constraining incentive system.

C. Cultural Preferences

Culturally-determined preferences with regard to type of work and location of work exist in every society. Certain preferences due to a cultural-social-psychological causation syndrome constitute constraining factors in the career choices of university-trained manpower.

As in the case in many other developing countries, Malaysia is witnessing a restructuring of her elite. The intelligentsia constitutes an important segment of the emerging new elite. Professionals and academicians are being called upon to assume leadership in a widening field of activities. The upper echelons in the government administration, business

enterprises and institutions involved in scientific and technological development are expected to absorb university-trained personnel.

This leadership is, however, concentrated in the capital city and a few growth centers. Spatial diffusion of power, leadership and talent has not taken place to any large extent despite some recent policy emphasis on decentralization. Consequently, university-trained manpower is still primarily oriented towards seeking employment in the administrative, industrial, and cultural centers and competing for the top positions, even at the expense of temporary or chronic under- or unemployment. For example, a considerable number of university-trained individuals prefer to wait for relatively long periods in order to obtain positions in Kuala Lumpur and some other urban areas rather than be employed in small towns in which there are openings.

The new intelligentsia is influenced by attributes of life styles in the highly industrialized countries and thus the urban life--a car, air-conditioning and a situation generally removed from the vagaries of climate and the natural environment. Equally attractive is the fact that the larger urban centers tend to diminish societal barriers and compartmentalization, thus freeing the individual, to some extent, from the bonds of traditional cultural values and generally fostering individualistic behavior and mobility. All this seems to be highly attractive to university-trained persons and reinforces their desire to confine their professional work to a few large urban

centers. It may well be that in the minds of students a nexus exists between the earning of a university degree and the distinct possibility of being able to live and work in the capital. The steps in promotion for government as well as for private employment also reflect this central tendency. The higher the rank, the greater the likelihood of being able to reside in a large city.

Many observers expound the hypothesis that the "frontier spirit" is lacking among young people, meaning that the response to challenge that drove young people in Europe's and America's past to face unprecedented tasks and work under trying circumstances is not forthcoming. This researcher does not contend that any such one-directional causality exists. There is no evidence that the young, university-trained generation cannot be inspired by the frontier spirit. In fact, in the survey about half of the new students indicated no desire to avoid certain types of activities or places of work. This must be expected to change with increasing acculturation and the researcher is inclined to suggest a complex circular causation in that the developmental pattern forces the young intelligentsia to stay within the power and growth centers and that their aspirations are thus rationally geared toward the urban center.

Cultural and social systems anchored in traditional value-systems tend to assign discriminatory social attributes to various kinds of activities. Thus the social status of an individual may be related to his proximity to menial labors, the comforts of his life-style, his freedom from organizational

and bureaucratic rigidities and formalities, etc. It is very difficult to produce scientific evidence of cultural preferences for, or discrimination against, certain activities by the various ethnic and social strata of Malaysia's youth. Especially since the new generation in general, and the highly educated in particular, are apt to abandon some of the traditional prejudices. On the other hand, there seems to be enough evidence to hypothesize that in many cases the high social status that goes with a university degree is being used to elevate the individual from activities that are deemed to be less desirable. This, of course, is true for most societies. But it is somewhat contrary to the need for initiative, self-reliance, and enterprising and risk-taking spirit that one would like to instill in the educational young elite of a developing country. It is symptomatic that members of the Faculty of Agriculture could not name a single graduate who had actually engaged in any type of agricultural production. All their graduates had gone into either administrative or teaching occupations. Likewise, there is no incident that can be remembered by the Faculty of Economics in which a graduate became a founder, co-founder or the inspiration for a new enterprise. Part of the preferences are ingrained in the students' prevailing value-systems, but in addition, the social system does not offer many opportunities nor does it allow a great extent of freedom of choice to the individual.

D. Constrained Educational Inputs

Some of the input constraints that manifest themselves at the intake for the university level have to be traced to the preceding level of education. Reference was made in Chapter IV to the school-system and its present constraints in terms of teaching skills, facilities, teachers' attitudes, and orientation.

The educational system can affect the changes of educational orientation only at a relatively slow pace that is dictated by the process of producing teachers who will adopt the role of change agents. Therefore, what is most needed is a sufficiently large cadre of educators who are able to identify the value-determined behavior patterns of which they themselves are part and then provide inputs into the teaching and learning process of the young to affect changes in attitudes and preferences. This condition of self-induced and self-sustaining change through the educational system will not be met within a short period. It is a task that stretches over several generations of teachers, pupils, parents, and again pupils, teachers, etc.

Malaysia's chief educators and upper echelon politicians are fully aware of the necessity for change of preferences in the young generation. But as was elaborated upon earlier, the educational policy in general and higher education in particular, is subject to a dichotomy of goals: the quantitative expansion and qualitative upgrading and diversification. Political

necessities seem to dictate that the larger portion of resource inputs be spent on providing education to greater numbers of aspirants. This has taken place according to well-established patterns and types of education which are demanded by the constituency along traditional patterns. This implies the danger of perpetuating preferences of study in the humanistic fields of study, seeking of employment with the government and very weak responses to the changing employment structure and the market.

The expansion of education and diversification into technological-scientific, entrepreneurial training and subsequent change of preferences does receive attention by the planners but cannot as yet attract a proportional share of inputs into the educational system. The survey data has shown that a significant number of new students felt constrained because of their high school education. Chapter IV revealed several aspects in which high school facilities and high school pupils are subject to input constraints.

E. The University

The University has fostered two images of its role in national life. First, it has become an institutionalized political factor. Second, it has consolidated its image with the public as a gateway to elite status for its graduates.

The University has not yet succeeded, however, in establishing itself as a cultural center, asserting intellectual leadership, and vitalizing national culture and national life

through innovative contributions and initiative. Furthermore, the University has not yet established a role nor has it been called upon in national problem-solving to participate.

The University has for many years undertaken very little to make its influence felt in the national educational process or to actively participate in the policies and processes that determine the skill composition of the nation. The University has mainly responded to popular demands, specifically the politically-backed demands, for certain kinds of education resulting from the pattern of secondary education, the prevailing value system, current employment practices and the incentive system.

Only during the last three years has widespread concern arisen about the unbalanced composition of higher education. Measures have been taken such as limiting access to some already overcrowded faculties and channeling larger numbers of students into the pre-engineering or pre-medical courses to facilitate the entry of larger numbers of students into full-fledged study in the respective faculties. The recent debate seems to center on the short-term remedies and the political implications of rebalancing.

What the observer has not noticed, are more systematic efforts towards educational re-orientation, involving the changing of occupational preferences of the pupils and aspirants to higher education. The researcher has not been able to trace systematic attempts to disseminate information on the education programs, requirements, career descriptions, manpower needs to educators, pupils or the general public.

Furthermore, the University does not actively acknowledge within its own confines or beyond, the necessity to link the privilege of higher education with the social responsibility of performing the tasks urgently required for a developing society. Instead, the University remains an "ivory-tower" institution. It is assumed that knowledge imparted in the university educational process will be put to the best advantage of the individual and society. This cannot, however, be automatically assumed. Thus the University should assume part of the responsibility for supplying the country with urgently needed, action-oriented, enterprising professionals who at the same time are instilled with social responsibility. Presently the students can expect only very little inspiration from the University along these lines.

The University could assume such responsibility by playing a role as a very prestigious source of information, persuasion, and incentives to secondary school pupils. The University could even reach beyond this goal and exert influence on all segments of society through all media as a cultural, intellectual leader and pacesetter. Presently, such an intensive information disseminating drive or counseling is not undertaken and the degree of misconception is evidenced by the data from the survey of new students. The University is constrained in its present influence upon students by their cultural preferences and social conditioning of its own personnel. It is the impression of the researcher that a large number of the teaching staff is content and absorbed solely with teaching.

There are of course some intellectual leaders, administrators, and educators who would like to extend the University's influence beyond the "ivory tower". That is to lead in cultural revival, and take the initiative in nationally relevant research, and assist the government in national problem-solving and influence the direction and content of higher education. Such involvement of the intelligentsia and youth would not be completely without political implications and in the delicate political environs of Malaysia, this seems to be feared.

Since this study is not directly concerned with the political, social and administrative aspects of the supply of study places but primarily with the demand by aspirants, these important issues of the supply aspects can only be dealt with in passing. It must be emphasized here that the supply of study-places and the demand by school-leavers has to develop simultaneously. This is a long-term proposition interdependent with social preferences and political demands. It is acknowledged that the University could affect few changes on its own, if political and financial support is not forthcoming. As was indicated previously, some of the recent re-allocations were necessitated by the limited capacity of high-cost faculties.³ Nevertheless, there seem to be indications that the budget of

³The annual total cost per student in the Faculties of Arts, Engineering and Medicine is M\$3,600.-, 5,840.- and 6,940.-, respectively. (Estimates provided by the Vice-Chancellor's Office in 1970).

the University of Malaya will grow and will be funded to accommodate change.

At the same time, the Government has encouraged the possible establishment of new universities; but there is continuing debate over how these universities would pattern themselves. Are they to yield to widespread public and politically potent pressure to supply more study-places at the fastest possible pace, thus opening their gates to a larger intake of students into fields of study with easier requirements? Or are they to follow top-level governmental recommendations to balance their intake and in particular, provide study-places in scientific-technological fields of study? It is too early to evaluate these latest developments.

F. Family and Community

The extended family is a main source for advice, counseling, persuasion, and discussions on educational options and career-choices. Not only family members are included, but the family's access to informal, educated, or influential persons comes into play. In particular, families that have a member or friend who are relatively highly educated do have intensive discussions about the career plans of the children among the adults and the adolescents concerned. Within a relatively small country like Malaysia and a still rather compartmentalized society, a fairly large proportion of families have access to people who have moved into income groups, prestige groups, and life-styles which make them predestined to give advice to those who aspire to them.

The tabulation of responses to QUESTION 9 shows that 40 percent of the students had close relatives with a university education. There are families, however, especially in small towns and rural areas away from the main development centers, where the sequence from the small-scale farmer to children aspiring to a university education takes place in one generation and where there is no easy access to family members or friends with the respective experience. The tabulation on QUESTION 8 reveals that 53 percent of the respondents come from families in which the father had only a primary level education. (The 4 percent of no-responses probably contain a number of cases in which the fathers' had no formal education at all.) In families in which higher levels of education can be attained for the first time it is only rational that the aspirant is inclined and advised to seek out the path with the least risk of being shifted out before he can obtain a degree. Symptomatic for this quite rational behavior are observations of the Chief Education Officer of one of the States, who indicated that many parents request that their children be rechanneled from the science-stream to the arts-stream, often in instances in which the respective pupils encountered only slight difficulties or mild stress.⁴

Information rotated through family members or friends is in great danger of being confined to very limited and personal experience and thus information inputs may not be very effective in providing an array of alternatives--pros and cons.

⁴The Strait Times, July 19, 1971.

Newspapers and other public media carry reports about the employment situation, shortages in certain professions, respective releases from the Ministries, enrollment proportions at the Universities and other related information. The researcher is inclined to assume that the media contributes to the information-intake of parents and pupils. But it is doubtful that only casually interested readers--parents, pupils, etc.,--will derive a coherent picture of present and future opportunities. As an aid in decision-making especially, the media do not furnish more than fragments.

G. Schools and Their Counseling Functions

The impact of schooling on the student generation and specifically the options open to them when entering the University, were dealt with before particularly in Chapter IV. In this context the counseling function and value-forming functions of schooling are pointed out here.

Each secondary school is supposed to appoint one member of its teaching staff to the duties of Guidance Counselor. Since these duties are an additional burden and responsibility, the tasks of counseling are not taken on very enthusiastically.⁵ Besides, special knowledge and an information basis for effective counseling are limited. The Regional Guidance Officers under the Ministry of Education provide short training periods for

⁵ Impression gained from various educators and administrators interviewed.

counselors in their respective regions in order to impart a minimum of information and techniques. The counselors' main consultations are with pupils who terminate their schooling in secondary schools. They provide them with information and advice on formalities, such as where to register as unemployed, or what vocational training facilities exist and how to apply for them. In the context of higher education, the counselors are usually inexperienced and cannot provide advice other than on how to apply for scholarships and what formalities to undergo in order to obtain admission.

Many of the schools make some efforts to orientate pupils. For instance, professionals are invited to schools to talk about their careers, and the educational implications, etc. Prospects of employment in these cases will most likely be derived from highly personal, subjective insights and be confined to the present occupational structure only, without taking structural changes into account. It was also found that the professionals invited, were from a few select professions and from the ranks of coveted, much desired and probably already oversupplied professions; such as lawyers, or administrators. In not one of the cases known to the researcher was a presentation given by an engineer, architect, agronomist, chemist, agricultural extension worker, or entrepreneur. Schools were not supplied with printed material from official sources which could be utilized for counseling.

A few schools, in the Kuala Lumpur and Penang metropolitan areas, have obtained guidance counselors provided by a semi-private

counseling agency. The counseling agency is essentially a voluntary undertaking, financed largely by the local Rotary Club. The counseling agency operated with a staff of two professionals (one of them a Peace Corps Volunteer), and two secretaries. It seems that their main function was to counsel individual pupils who trickled into the office very sparingly, and to organize information talks in schools. They issued a bulletin containing information on the present employment situation for professional and highly skilled occupations but did not distribute it on any significant scale. Much of their informative activities were directed toward disseminating information on the various facilities of higher education and other institutions of continuing education and their requirements and aptitudes. All-in-all, the intentions and the activities of the counseling agency were very laudable and useful, the only limitation being that their main focus was on advising about educational opportunities and they did not delve systematically into employment opportunities. Besides, the agency did not have the resources to launch major counseling campaigns on any significant scale.

The University is relatively well covered by the media as far as information on the political processes and policy-decisions and the development and expansion of facilities at the University are concerned. The University does not, however, to the best of the researcher's knowledge, supply any material to high school pupils, or teachers, which could influence students' career-choices in particular. Schools have access to Bulletins and Calendars but information is restricted to the

formalities of the University and its faculties. From the data of the survey, it was concluded that not many students had even used this information.

The tabulations for QUESTIONS 35 and 36 show that only 16 percent of the respondents had any information on subject-content of field of study or on methods of learning and teaching at the institutions of higher education. Only 18 percent of them received this kind of information from the University and 39 percent had access to information through their schools. The rest relied on hearsay and friends and relatives as sources of information.

There is no large-scale effort to convey more realistic expectations as to what roles students should and could play upon graduation. Students simply do not receive sound guidance designed to counteract their culturally determined aspirations and provide them with a more realistic set of expectations on which they could base their choice.

Schools also neglect one of the most important aspects, insofar as there is no consistent effort being made to reorient the attitude with regard to certain types of activities. The curriculum for the comprehensive secondary schools does include several vocational areas, e.g., arts and craft, industrial arts, home science, commercial studies, technical drawing, and agriculture, but the pupil is compelled to take only one of these optional subjects which then amounts to approximately 8 percent of the total weekly classroom minutes.

In many schools, particularly those in small towns and in rural areas, the teachers and facilities to offer these subjects are not available, let alone to teach them effectively. Clearly, in the view of headmasters, teachers, parents and even higher-level officials, the vocational subjects are of a lower priority and what is more significant are also among the lower rungs of status and prestige. Often the least qualified teachers or teachers with the least seniority are burdened with the task of teaching these subjects.

It is obvious that industrial skills, scientific-technological and entrepreneurial expertise, cannot be expected as a direct result from the teaching of such subjects on primary and secondary school levels. At the same time it must not be overlooked that the appreciation of creative work, both manually and intellectually, in crafts, in industrial production, in newly founded enterprises and in production on the land, can be instilled in a child of primary school age and can be further cultivated at the secondary school level. These aspects are of importance in the context of value-forming and the preparation for a life of useful activity.

The same pertains to the ideas of service to community and country. It is difficult to obtain quantitative, conclusive evidence, but it is hypothesized that a large number of students aspiring to higher education, are motivated mainly by self-interest, by monetary gain, and by the attainment of prestige and status. It cannot be denied that a healthy measure of self-interest will also produce benefits to the community and society.

As long as medical doctors have a distinct possibility of becoming wealthy it is likely that the country will obtain an increasing number of medical doctors provided that market forces are not obstructed by limited entry, limited training capacity, etc. However, when guided by profit and status alone, it cannot be expected that young professionals make even the slightest sacrifice out of social responsibility or a pioneering spirit. Doctors will not practice in the relatively undeveloped hinterland not even in the smaller cities. Teachers will endure employment rather than relocate to villages; engineers will resent being on duty in frontier areas and government officials will gladly delegate field work to less qualified subordinates. Schools could be an effective instrument to gradually break the chain of causation and begin to change attitudes, instill motivation and produce dedication to tasks which are necessary in the course of national development.

H. Government

The government agencies most immediately involved are the Ministry of Education, the Economic Planning Unit, and the Ministry of Labor. These governmental agencies, besides formulating policies, engage in activities which have the function of informing and guiding pupils and parents. The Ministry of Education sponsored and cooperated with the Committee on Higher Education which published a report in 1967. The document has circulated widely, but it is of immediate interest only to civil servants, political officials and educators. The Report

was not issued for public consumption. The Division for Educational Research and Planning in the Ministry of Education has a Guidance Unit which purports to coordinate the nine regional guidance officers who undertake vocational guidance efforts at the secondary school level, specifically described under "Counseling in Schools".

The Economic Planning Unit is the central planning and coordinating body in the context of manpower planning. However, the Committee for Manpower Planning does not engage in any public relations or information service activity. Its output is almost inaccessible to anyone outside the circle of civil servants concerned with manpower questions.

The functions of the Ministry of Labor include mainly problems of employment, labor legislation and placement services. A manpower survey was undertaken by the Ministry with the Statistics Department but this survey did not concern itself to any significant extent with highly trained and professional manpower and was still a confidential document at the time of this writing.

Even though the Government is the principal initiator of development and change it can only operate very cautiously under the political constraints. In Malaysia's political system general public opinion and particularly communal interests are important factors. It cannot be overlooked that the government does constantly expound the importance of science and technology and pioneering work in areas and with people who have been least affected by change and progress. The educational

pipeline for qualified manpower in these subjects has only begun to fill slowly. Furthermore, the aspirations of the highly educated are not directed toward the activities where their contributions would be most beneficial. The numbers of enterprising and creative scientists, technologists, and managers have not been forthcoming in proportion to the development goals. There is no doubt that manpower planners in Malaysia are aware of the quantities and sequences involved. What is, however, overlooked is that employment structures, incentive systems, and to some extent, cultural orientation and societal values have to be taken into account in the context of educational and manpower planning. These aspects are rather more difficult to influence. However, as long as there are wide discrepancies between what formal education has as its official goals and what social, economic and cultural factors actually promote; educational output is in danger of being inconsistent from the point of view of manpower planners.

With regard to its policies for higher education, the Government is beset by several conflicting pressures and the agencies concerned with the planning of higher education are faced with three competing objectives for their administrative actions. One of the objectives is to further stimulate the public to engage in as much education as possible. These efforts seem to have been effective insofar as they have caused a rush to educational opportunities including the University. As a second objective, the capacities of the institutions of higher education have to be maintained in order to safeguard

academic standards. Third, efforts have to be made to expand higher education along quantitative and qualitative dimensions. The proportion of students in traditional courses of study and the hitherto undersupplied fields of study, especially, have to be changed. At the same time, content and methods of study in all fields have to be improved.

The Government does not seem to have pursued an effort, until recently, to bring about a more balanced composition of higher education. The University was considered an open system, geared to accommodate public demand for higher education of any kind. The forces of public demand were allowed free play, which swelled the liberal arts fields of study. A more forceful and persistent emphasis on reportioning and expanding the science and technological fields of study could only have been applied at the expense of decreasing academic standards, under the circumstances of severely constrained educational inputs in these areas of knowledge. While standards have been maintained, the expansion in the scientific-technological areas of expertise has been relatively slow.

There is a political aspect involved in the form of priority in policies designed to facilitate a wider participation of Malays in higher education. As already explained in other contexts, by far the largest number of Malays graduating from high schools, came through the arts-stream and consequently fulfilled the requirements for entry only into the liberal arts faculties (Arts and Social Sciences). Restricting the number of admissions into the liberal arts faculties would mean restricting the main avenue of entry for Malays into the University and would

thus contradict another goal which, by the way, is mostly outside the realm of education. At the same time, the graduates from the liberal arts faculties were readily absorbed into governmental and administrative positions and into the teaching profession. Until recently, there were no compelling reasons to curb the respective intakes at the university level. Of course, it could be argued that government positions could be filled with a different composition of skills; but as it stands, the University supplied the needs of the prevailing employment practices and incentive systems.

Attempts to affect changes encounter considerable public and political pressure from vested interests. University administrators indicated that limiting entry into the liberal arts faculties was attempted. This measure would have affected Malays harshly. Consequently, political pressure resulted in the admission of larger numbers in order to boost the Malay element of the overall student population. Several indications gave rise to a hypothesis that the Universiti Kebangsaan⁶ was instituted mainly for reasons of affording higher education to Malays, and at present, that means for all practical purposes another increase in students in the liberal arts field of study. On the other hand, it could well be that the peak of this

⁶A newly established University with predominantly Malay student-intake and as of now also largely forced to maintain a disproportionately large Arts Faculty.

development has been passed. The researcher has observed a growing concern in the University and in the government about possible development of a surplus of graduates from the liberal arts orientation due to the realization of employers, including the government, that there is a compelling need for more scientific orientation and technological applications.⁷

At the same time, more science-oriented facilities and an increased number of science teachers with improved training will mean that more Malays will have access to secondary schools where they can acquire a background in scientific and technological subjects. This will clearly have the effect that more Malays will be able to compete for entry into the University's science and technology fields of study.

Other administrative measures, such as financial aid to students and counseling seem to be limited in their effectiveness in bringing about a balance as was analyzed in Chapter VII.

In addition, the government is involved in a conflict over the degree of autonomy the University should and could maintain and how much it should serve as an instrument of governmental development policies. The government is likely to succeed

⁷The highest ranking Administrative Officer of the University of Malaya, Pro-Chancellor Tan Sri Mohammed Suffian, made very succinct statements to this effect in his convocation address, May 1972:

The choice of subjects is important and must be in conformity with the country's needs. Only then will the graduates find it easier to get jobs. There will, be an acute shortage of qualified staff of high calibre if nothing is done to expand the flow of graduates to the required areas.

in establishing a tighter reign on the composition of higher education by budgetary means. Two factors are vital to achieving the goals of a better balance between the liberal arts and scientific-technological teaching. First, the school-system, particularly secondary schools, have to increase the quantity and quality of teaching in the science-technology subjects, particularly in rural schools, small-town schools, and Malay-medium schools. Second, a system of inducements has to operate on the pupils and their parents, in fact, upon all institutions involved in maintaining and evolving the socio-cultural value-systems (school, community organizations, political organizations, youth organizations, families, interest groups, etc.). Such inducements must be geared to influence aspirations, work preferences, and to some extent, evolve traditional values into new ones, more compatible with present and future national goals.

QUESTIONNAIRESURVEY OF STUDENTS ENTERING THE UNIVERSITY OF MALAYA
Academic Year 1971/72

The attached Questionnaire is to be carefully completed by all new Students who have been admitted to commence studies in May at the University of Malaya.

The Questionnaire is to be returned to the Registrar and must be received there by May 15 th, that is before you report at your Faculty. Therefore it is important that you complete it and send it off immediately. Send it in the enclosed envelope.

There is no need to write or sign your name anywhere; your identity will not be known.

You are urged to read and carefully answer each question. Give additional explanations when you consider it necessary.

EXPLANATIONS

There are 3 types of questions:

1. Questions which require you to write your answer into a boxed-in space
2. Questions which you answer by choosing from among several given answers and marking the respective box ☒
3. Questions which require that you rank the given answer, that means you have to order the answers according to your liking or preference, e.g.

You mark with ☐ 1 the answer that you prefer most
☐ 3 the answer that you consider third best
☐ 2 the answer that you consider second best
☐ and so on

Brief explanations for individual questions are given in brackets

[explanations
here]

QUESTIONNAIRE

1. Sex

male ☐female ☐

2. Race

Malay ☐Chinese ☐Indian ☐Other ☐

3. To which Faculty did you apply for admission?

1st choice 2nd choice

To which Faculty are you admitted?

4. Which career do you aim for?

engineer ☐government administrator ☐business executive ☐secondary-school teacher ☐university lecturer ☐medical doctor ☐scientist ☐other than in teaching ☐

(Indicate your career-aim by
marking respective box ☒)

Describe your career-aim in more detail!

5. In which stream did you get your HSC?

arts ☐science ☐

6. What was the medium of instruction in your school?

Malay ☐English ☐

7. What is your father's or guardian's occupation, or the source of his income?

(describe in detail,
indicate whether employed or self-employed,
whether working in small, medium, or large firm)

write legibly in here

8. Which is the highest level of formal education that your father obtained (in any medium or any school-system)?

primary level ☐secondary level ☐post-secondary professional
training or college education ☐university ☐

(Indicate the highest level by
marking respective box ☒)

9. Has any close relative obtained a high level of formal education?

(Indicate the highest level by marking the respective box ☒)

completed secondary level ☐
 post - secondary professional training or college education ☐
 university ☐
 don't know ☐

10. Is your father, mother or a brother actively participating in a political, communal, social, cultural or welfare - organisation or association?

yes ☐
 no ☐

If yes, what is the name of the organization?
 What office, if any, is your father, mother or brother holding?

11. Rank the following careers according to the prestige they have in your opinion!

(mark the highest prestige with the next highest prestige with and so on for all careers)

(5)
 (1)
 (2)
 (4)
 (3)

lawyer
 engineer
 higher-level government administrator
 business executive
 secondary-school teacher
 university lecturer
 medical doctor
 scientist

☐
☐
☐
☐
☐
☐
☐
☐

12. Rank the following careers according to what you think are their average earnings!

(mark the highest earnings with the next highest earnings with and so on for all careers)

(4)
 (1)
 (2)
 (5)
 (3)

lawyer
 engineer
 higher-level government administrator
 business executive
 secondary-school teacher
 university lecturer
 medical doctor
 scientist

☐
☐
☐
☐
☐
☐
☐
☐

13. What is the most important source of your information about earnings referred to in the previous question?

(Indicate the source by marking the box ☒)

Information you obtained from brochures and statistics issued by Government Departments and the Press.

☐

Information obtained from teachers, school officials and information-talks in your school.

☐

Information from relatives or friends who you think have relevant insight.

☐

unspecific hearsay from various sources.

☐

you do not have information, but you make a guess.

☐

14. According to your information, what are the employment opportunities for people with qualifications for the following professions?

Write one of the attributes: very good, good, not so good, difficult, very difficult into the spaces provided.

Engineer, mechanical	<input type="text"/>
Engineer, electronic	<input type="text"/>
Engineer, civil	<input type="text"/>
high-level Government Official	<input type="text"/>
Business Executive	<input type="text"/>
Secondary-school Teacher, arts	<input type="text"/>
Secondary-school Teacher, science	<input type="text"/>
University Lecturer	<input type="text"/>
Medical Doctor	<input type="text"/>
Scientist, other than in teaching (Physicist, Chemist, Biologist, Mathematician, Sociologist, etc.)	<input type="text"/>

15. What is the most important source of your information about employment opportunities referred to in the previous question?

Indicate the source of most of your information by marking the box ☒

unspecific hearsay from various sources	<input type="checkbox"/>
information from relatives or friends who you think have relevant insight.	<input type="checkbox"/>
information you obtained from brochures and statistics distributed by Government Departments and the Press.	<input type="checkbox"/>
information obtained from teachers, school officials and information-talks in your school.	<input type="checkbox"/>
you do not have information, but you make a guess	<input type="checkbox"/>

16. What do you think are your employment-chances after your graduation?

Indicate the one that best describes your expectations by marking the box ☒

find employment <u>easily</u> in your field	<input type="checkbox"/>
find employment with <u>some difficulties</u> in your field	<input type="checkbox"/>
find employment <u>easily</u> of some kind, <u>not related to your field</u>	<input type="checkbox"/>
expect to be <u>unemployed</u> for some time	<input type="checkbox"/>

17. Rank the following according to their importance in helping you to obtain employment.

(mark the most important with 1
the next most important with 2
and so on for all 6 items)

1
2

influential relatives, friends
professional titles and degrees
skills that are in demand
competence in your work
experience
honesty, integrity

18. Rank the advantages of a University degree according to their importance to you !

(mark the most important with 1
the next most important with 2
and so on for all 5 items)

1
2

higher income
higher prestige
more and better opportunities to find employment
more interesting and satisfying work
easier life

19. If you were not admitted for study at the University what would you want to do instead ?

(indicate which you prefer by marking the respective box)

X

try to enter into professional training or into a college for full - time study

get a job and study part-time

try to work your way up through excellence in a job

be content to make a living from a satisfactory job

be unemployed, stay at home

20. What is your opinion on studying for several years ?

(indicate one which best expresses your opinion by marking the box)

X

you are happy and find it interesting

it is necessary in order to get ahead

it is waste of time and effort but you are compelled to go through it

you have no opinion on this point

21. If you had a choice to engage in the following activities for some length of time, which ones would you try to avoid ?

(indicate one or several which you would try to avoid by marking the boxes)

X

work requiring frequent contact with poor or uneducated people.

governmental work on the local or district level

technical work in rural area or small town

managerial work in company in small town

scientific field - work under difficult conditions.

teaching or instructions in small town or rural area

you would not try to avoid any

22. For which reasons would you avoid some of the above activities ?

(Indicate one or several by marking the respective boxes ☒)

they do not require a high level of education ☐
 payment for this kind of work is too low ☐
 my social status would decline, people would think I am not very successful ☐
 life would be too uncomfortable ☐

23. After graduation would you prefer to live and work -

in or near large town ☐
 in small town ☐
 in rural areas ☐
 anywhere ☐

24. How did you get into the arts-stream or science-stream during your schooling ?

(Indicate the most decisive reason by marking the respective box ☒)

your parents, relatives, or friends advised you ☐
 your grades determined which stream you entered ☐
 your interest and liking for the subjects ☐
 your liking of certain teachers ☐
 advice of teachers and other school officials ☐
 you thought the chosen stream would best prepare you for your intended career. ☐
 by chance you ended up in the stream ☐
 there were not enough places in science classes ☐

25. If you could, would you choose the same stream again ?

yes ☐
 no ☐

26. Rank the following subjects according to your confidence in mastering them !

(mark the one in which you feel most confident with
 mark the next best one with
 and so on for all subjects listed)

③
①
②
④

Bahasa Malaysia ☐
 English ☐
 Mathematics ☐
 Physics, Biology, Chemistry ☐
 Economics ☐

27. In which town did you attend upper secondary school ?

28. Have you been given a scholarship, bursary or loan ?

yes ☐
 no ☐
 don't know yet ☐

29. What kind of scholarship, bursary or loan

describe in here

Amount of scholarship, bursary or loan per academic year

\$

30. Is the scholarship, bursary given for a specific field of study?

yes ☐

no ☐

31. Were you discouraged from applying to a particular Faculty because you had information that it was difficult to be admitted?

yes ☐

no ☐

If yes, which Faculty

32. Did you receive any official information, verbal or in print, (from Government Departments, through your school, or Press) on any of the following?

(Indicate one or several by marking the boxes ☒)

requirements for various fields of study ☐

chances of admission at various Faculties ☐

availability of various scholarships ☐

employment opportunities ☐

the Government's aims and policies concerning Higher Education ☐

33. If you received any of the above information how did it influence your choice of field of study?

(Indicate by marking one box)

reinforced your choice of field of study ☐

made you change your field of study ☐

had no influence on your choice ☐

you chose the Faculty on the basis of the information ☐

34. Rank, what you think is, the degree of difficulty of study at the various Faculties!

(mark the most difficult one with 1, the next difficult one with 2 and so on for all Faculties)

③
①
②
④

Faculty of Economics and Administration

Faculty of Agriculture

Faculty of Engineering

Faculty of Science

Faculty of Medicine

Faculty of Arts

☐
☐
☐
☐
☐
☐

35. Did you receive any of the following information prior to your application for admission

Information on subject-content of your field of study ☐
 Information on the methods of learning and teaching at the University ☐

36. If you received any of the above information, indicate the most important source you received it from !

Information received from University prior to application ☐
 Information from teachers or through school ☐
 Information from official counseling ☐
 Information from relatives, friends ☐
 unspecific hearsay ☐

Indicate one or several by marking the boxes ☒

37. If someone wants to qualify for the professions listed below, which Faculty would one choose ?

choose from the Faculties: Economics and Administration
 Arts
 Medical
 Science
 Agriculture
 Engineering
 and write into the spaces below.
 In some cases several different Faculties are possible.
 Fill in as many as you can !

If someone wants to become an Accountant one would study at the Faculty of

Entomologist

Business Manager

Geologist

High-level Administrator in the Ministry of Health

Agronomist

Biologist

Statistician

Surgeon

Secondary-school Teacher Mathematics and Physics

Marketing Expert

MAKE SURE YOU DID NOT OVERLOOK ANY QUESTION !

MASTER TABULATION

APPENDIX B

CODING SCHEME AND TABULATION OF RAW DATA

Column, Variable Name	Code	Question #	Information	Distribution of Responses	
1 - 4	# of form			SAMPLE - SIZE 2005	
5	# of card				
6	1 2	1.	SEX - distribution of newly admitted students	male female	67,8 % 32,2 %
7	1 2 3 4	2.	RACE - distribution	Malay Chinese Indian Other	50,7 % 40,1 % 7,6 % 1,6 %
8,9,10		3.	FACULTY APPLIED TO and FACULTY ADMITTED TO (in %)	1 st choice	2 nd choice* admitted in
	1		FEA	25,1	19,3 21,0
	2		Arts	43,3	20,5 47,2
	3		Science	13,0	13,5 17,2
	4		Engineering	8,1	4,0 7,5
	5		Medicine	8,3	1,3 3,5
	6		Agriculture	2,2	4,6 3,4
			* no second choice indicated	36,7 %	
11	1 2 3 4 5 6 7	4.	CAREER - AIM	engineer government administrator business executive secondary-school teacher university lecturer medical doctor scientist	8,3 % 21.3 % 15.2 % 27.1 % 13.5 % 5.6.% 8.3 %
12	1 2	5.	SECONDARY SCHOOL STREAM	arts-stream science-stream	68.0 % 32.0 %

Column, Variable Name	Code	Question #	Information	Distribution of Responses
13	1	6.	MEDIUM OF INSTRUCTION in secondary school	Malay 24,7 %
	2			English 75,3 %
14-15		7.	FATHER'S OR GUARDIAN'S OCCUPATION, categorized as follows:*	
	1			large-scale business executive; government officer, highest level; professional, self-employed 0,8 %
	2			large-scale business wage earner, highly skilled; medium-scale business owner-operator; government officer, high level; university lecturer; professional, employed 5,3 %
	3			large-scale business wage earner, skilled; medium scale business, operator; government officer, medium level; teacher, secondary and primary; supported by well-to-do kin; retired (with secondary education) 24,3 %
	4			large-scale business, wage earner, unskilled; medium-scale business, wage earner, skilled; small scale business, owner-operator; government officer, low level; 32,1 %
	5			medium-scale business wage earner, unskilled; small-scale business wage earner, skilled; small-holder, owner-operator; supported by poor relatives; retired (with primary education) 33,3 %
	6			small-scale business wage earner, unskilled; small-holding operator or wage earner; petty trader, petty services; supported by relative 4,1 %
	7			subsistence level 0,1 %
				no response 0,8 %
				* detailed explanation in APPENDIX C
16	1	8.	FATHER'S LEVEL OF FORMAL EDUCATION	primary level 53,3 %
	2			secondary level 29,8 %
	3			post-secondary professional training or college education 10,9 %
	4			university 1,9 %
				no response 4,0 %
17	1	9.	HIGHEST LEVEL OF FORMAL EDUCATION OF CLOSE RELATIVES	completed secondary school 26,0 %
	2			post-secondary professional training or college education 18,4 %
	3			university 40,4 %
	4			don't know 13,7 %
				no response 1,4 %

Column, Variable Name	Code	Question #	Information	Distribution of Responses
45		15.	RESPONDENTS' MOST IMPORTANT SOURCE OF INFORMATION ABOUT EMPLOYMENT - OPPORTUNITIES	% of respondents who indicated*
	3		Brochures and statistics issued by Government and the Press	14 %
	4		Information obtained from teachers, school officials, and career talks	18 %
	2		Information from relatives and friends	13 %
	1		hearsay from various sources	26 %
	5		no information, makes guess	27 %
			*rounded to full % no response 2.4 %	
46		16.	RESPONDENTS' EXPECTATION ABOUT THEIR OWN EMPLOYMENT - CHANCES	% of respondents who indicated
	1		expects to find employment <u>easily</u> in his field	36.7 %
	2		expects to find employment <u>with some difficulties</u> in his field	45.1 %
	3		expects to find employment <u>easily</u> , but not rela- ted to his field	4.9 %
	4		expects to be <u>unemployed</u> for some time	13.3 %
			no responses 2.4 %	
		17.	RANKING OF IMPORTANCE OF ASSETS IN SECURING EMPLOYMENT	% of respondents who ranked in positions *
	1-6			1th 2th 3th 4th 5th 6th
47			influential rela- tives and friends	9 8 9 9 12 52
48			professional titles and degrees	58 19 9 7 5 2
49			skills that are in demand	20 33 17 16 11 3
50			competence in your work	5 14 26 26 23 6
51			experience	6 21 29 25 14 4
52			honesty, integrity	2 6 9 17 35 31
			* rounded to full %	

Column, Variable Name	Code	Question #	Information	Distribution of Responses
		18.	RANKING OF RESPONDENTS' ASSESSMENT OF ADVANTAGES OF UNIVERSITY DEGREE	
	1-5			% of respondents who ranked in position *
				1th 2th 3th 4th 5th
53			higher income	10 25 29 27 9
54			higher prestige	8 14 23 23 32
55			more and better opportu - nities to find employment	60 20 10 5 4
56			more interesting and satisfying work	17 30 18 22 13
57			easier life	5 10 20 23 43
			* rounded to full %	
58		19.	MEASURE OF STUDY MOTIVATION (judged by preference for alternatives if respondent were not admitted at the University)	
				% of respondents who indicated
	1		would try to enter into other types of training	40.3 %
	2		would try to get a job and study part-time	37.1 %
	3		would try to advance through excellence in a job	18.2 %
	4		would be content to make a living from a satis- factory job	3.3 %
	5		would be unemployed, stay at home	1.0 %
			no response 0.1 %	
59		20.	OPINION ABOUT STUDYING (measure of study-motivation)	
				% of respondents who indicated
	1		respondent is happy and finds it interesting	18.1 %
	2		respondent finds it necessary in order to get ahead	74.7 %
	3		respondents finds it waste of time and effort but is compelled to go through it	2.7 %
	4		respondent has no opinion on this point	4.6 %
			no response 0.5 %	

Column, Variable Name	Code	Question #	Information	Distributi of Respons
		21.	GIVEN A CHOICE, WHICH ACTIVITIES WOULD BE AVOIDED	
				% of respondents who indicated
60			work requiring frequent contact with poor or uneducated people	6.1 %
61			governmental work on the local or district level	6.7 %
62			technical work in rural area or small towns	9.9 %
63			managerial work in company in small town	7.6 %
64			scientific field - work under difficult conditions	20.0 %
65			teaching or instructing in small town or rural area	14.5 %
66			respondent would not try to avoid any	57.2 %
		22.	REASONS FOR AVOIDING CERTAIN ACTIVITIES	
				% of respondents who indicated
67			activities do not require high level of education	8.9 %
68			payment for this kind of work is too low	5.8 %
69			social status would decline, people would think that respondent is not successful	6.4 %
70			life would be too uncomfortable	31.3 %
			no response	58.0 %
71		23.	PREFERENCE FOR RESIDENCE AND WORKPLACE LOCATION	
				% of respondents who indicated
1.			in or near large town	29.2 %
2			in small town	12.0 %
3			in rural area	2.9 %
4			anywhere	55.8 %

Column, Variable Name	Code	Question #	Information	Distributio of Response
72		24.	MOST DECISIVE REASON FOR GETTING INTO ARTS - OR SCIENCE STREAM DURING SCHOOLING	% of respondents who indicated
	1		parents, relatives, friends advised	1.4 %
	2		respondents' grades determined	34.1 %
	3		interest and liking for the subjects	30.3 %
	4		preference for certain teachers	0.6 %
	5		advice of teachers or other school officials	1.6 %
	6		chosen stream would best prepare for intended career	18.2 %
	7		it was chance	10.1 %
	8		there were limited places in science classes	3.9 %
			no response 0.3 %	
73		25.	WOULD RESPONDENTS GET INTO THE SAME STREAM AGAIN	
	1		Yes	77.5 %
	2		No	22.5 %
			no response 0.3 %	
		26.	RANKING OF RESPONDENTS' CONFIDENCE IN MASTERING CERTAIN SUBJECTS	% of respondents who ranked in position *
				1th 2th 3th 4th 5th
74			Bahasa Malaysia	42 11 16 19 12
75			English	20 28 30 17 5
76			Mathematics	17 17 17 34 15
77			Physics, Biology, Chemistry	10 15 9 18 48
78			Economics	11 29 29 11 19
			* rounded to full %	

Column, Variable Name	Code	Question #	Information	Distribution of Response
79-80		27.	SIZE OF TOWN IN WHICH RESPONDENTS ATTENDED UPPER SECONDARY SCHOOL categorized as follows:	% of respondents who indicated
	1		(Kuala Lumpur, Georgetown, Ipoh, Johore Bahru, Klang, Petaling Jaya)	49.1 %
	2		population 50 000 - 90 000	31.0 %
	3		population 20 000 - 50 000	9.5 %
	4		population 10 000 - 20 000	4.0 %
	5		smaller towns	6.2 %
			no response 1.2 %	
1-4	# of form	28.- 29.	not coded	
5	# of card (2)			
6		30.	WAS SCHOLARSHIP OR BURSARY GIVEN AND TIED TO A PARTICULAR FIELD OF STUDY ?	
	0		no scholarship given	49.1 %
	1		untied scholarship	18.0 %
	2		tied scholarship	32.9 %
7		31.	RESPONDENTS WERE DISCOURAGED TO APPLY TO ANY OF THE FACULTIES BELOW BECAUSE THEY THOUGHT IT WAS DIFFICULT TO BE ADMITTED	
	1		discouraged to apply to FEA	12.7 %
	2		discouraged to apply to Arts	1.2 %
	3		discouraged to apply to Science	1.7 %
	4		discouraged to apply to Engineering	5.1 %
	5		discouraged to apply to Medicine	3.8 %
	6		discouraged to apply to Agriculture	0.0 %
			not discouraged and/or no response	75.4 %

Column, Variable Name	Code	Question #	Information	Distributi of Respons
		32.	DID RESPONDENTS RECEIVE OFFICIAL INFORMATION (From Government Departments, Schools, Press) ON ANY OF THE FOLLOWING:	
				% of responder who receiv
8			requirements for various fields of study	55.9 %
9			chances of admission at various Faculties	40.0 %
10			availability of various scholarships	45.2 %
11			employment opportunities	42.5 %
12			Government's aims and policies concerning HE	39.5 %
			no response to entire question 5.7 %	
13		33.	DID ANY OF THE ABOVE INFORMATION INFLUENCE THE RESPONDENTS' CHOICE OF FIELD OF STUDY ?	
				% of responder who indicat
	1		reinforced respondent's choice of field of study	30.5 %
	2		made respondent change the field of study	5.0 %
	3		had no influence on respondent's choice	37.1 %
	4		field of study was chosen on the basis of	21.5 %
			no response to entire question 5.9 %	
		34.	RANKING OF RESPONDENTS' PERCEPTION OF DEGREE OF DIFFICULTY OF STUDY IN THE VARIOUS FACULTIES	
				% of respondents who ranked in position
				1th 2th 3th 4th 5th 6th
14			FEA	2 5 12 20 56 7
15			Agriculture	1 3 21 49 20 6
16			Engineering	51 32 11 2 2 1
17			Science	7 15 41 22 11 4
18			Medicine	36 44 13 3 2 2
19			Arts	4 1 3 4 9 80
			no response ranges between 0.2 % - 0.4 %	

Column, Variable Name	Code	Question #	Information	Distribution of Responses
20		35.	DID RESPONDENTS RECEIVE ANY OF THE INFORMATION BELOW, PRIOR TO APPLYING FOR ADMISSION ?	
				% of respondents who indicated
	1		information on subject - content of fields of study	41.3 %
	2		information on methods of learning	29.0 %
	3			both 13.8 %
	4			none 29.1 %
		36.	WHICH WERE THE MOST IMPORTANT SOURCES FOR THE ABOVE INFORMATION	
				% of respondents who indicated
21			information received from University prior to application	18.4 %
22			information from teachers or through school	38.9 %
23			information through official counseling	3.6 %
24			information from relatives, friends	52.5 %
25			hearsay	13.6 %
			no response	16.3 %
26-27		37.	RESPONDENTS' ABILITY TO ASSOCIATE 11 PROFESSIONS WITH STUDY AT THE APPROPRIATE FACULTIES (16 possible matches*)	
			Scores	
			0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	
		% of respondents (rounded to full %)	1 0 1 3 3 8 7 16 13 21 10 12 2 1 0 0 0	
			* incorrect matches are deducted	

CATEGORIZATION - SCHEME FOR ECONOMIC STANDING OF RESPONDENTS' FAMILIES*

Large-Scale Business Executive	Large-Scale Business Wage Earner, highly skilled, Professional	Large-Scale Business Wage Earner, skilled	Large-Scale Business Wage Earner, low skills	Large-Scale Business Wage Earner, unskilled	
	Medium-Scale Business Owner-Operator	Medium-Scale Business Operator	Medium-Scale Business Wage Earner, low skilled	Medium-Scale Business Wage Earner, unskilled	
			Small-Scale Business Owner-Operator	Small-Scale Business Wage Earner, skilled	Small-Scale Business Wage Earner, unskilled
Government Officer, highest level	Government Officer, high level	Government Officer, medium level	Government Officer, low level		
	University Lecturer	Teacher, Secondary, Primary		Small-holding, Owner- Operator	Small-holding, Wage Earner, Petty Trader, Petty Services
Professional, self-employed	Professional, employed				
		Supported by Rela- tives, well-to-do	Supported By Relatives, with moderate income		Supported By Relatives, with small income
		Retired, (Secondary Education)		Retired, (Primary Education)	

1 2 3 4 5 6 7

* A scale is implied, receding from 1 to 7, based upon remuneration of professions and the different kinds of employment, or means of support

CATEGORIZATION SCHEME FOR SOCIAL, COMMUNITY INVOLVEMENT
OF RESPONDENTS' FAMILIES

Elected, Appointed Office in Political Organization Major Functions: Equivalent to President, Secretary, Treasurer, etc.	Minor Functions	Minor Function	Minor Function	Minor Function	Cultural, Welfare Organization, Religious Affiliations
	Communal, Administrative Organization (Ketua Kampung, Youth Organization, School Boards, etc.) Major Function		Supra-Local Interest Group (Trade, Professional Association) Major Function		

CLASSIFICATION OF TOWNS BY POPULATION SIZE *
(in thousands)

Kuala Lumpur	451.7	
Georgetown	270.0	
Ipoh	247.7	1
Johore Bahru	135.9	
Klang	113.3	
Petaling Jaya	92.6	
Malacca	86.3	
Seremban	79.9	
Alor Star	66.1	
Butterworth	61.2	
Muar	61.2	2
Kota Bahru	55.0	
Taiping	54.6	
Kuala Trengganu	53.3	
Batu Pahat	53.0	
Telok Anson	44.6	
Kuantan	43.4	
Kluang	43.3	
Sungei Petani	35.8	
Jinjang	27.4	
Bukit Mertajam	26.6	3
Kampar	26.5	
Ayer Itam	25.6	
Bentong	22.7	
Kajang	22.5	
Sungei Siput	21.3	
Kulim	18.4	
Raub	18.3	
Segamat	17.8	
Dungun	17.5	
Kuala Kangsar	15.3	
Pangkajene	14.4	
Bukit Baru	14.3	
Chukai	12.5	4
Kuala Pilah	12.5	
Tangkak	12.2	
Peringat	11.9	
Kulai	11.8	
Mentakab	11.3	
Pasir Mas	11.2	
Tumpat	10.7	
Batu Gajah	10.6	
Port Dickson	10.3	
smaller than	10.0	5

* Field Count Summary of 1970 Population Census, April 71

STATISTICAL TECHNIQUES

1. Kendall's Tau or Coefficient of Concordance

For the purpose of estimating the relationship among several sets of numerical ordinal data, (ranks) the only available method to arrive at a single value is Kendall's Tau. This measure of overall relationship between the rankings is obtained by computing the rank-order-correlation for all possible pairs of any two of the rankings and then computing the arithmetic mean of all rank-order correlation coefficients. The computations are computerized utilizing the Statistical Package for the Social Sciences¹ which used the formula:

$$\text{Kendall's Tau} = \frac{2 m (P - Q)}{N^2 (m - 1)}$$

m = number of columns in the table

P = all pairs in which the order on one variable is the same as the order on the other

Q = all pairs in which the order on one variable is the opposite of the order on the other

N = number of observations or cases

¹N. Nie, H.B. Dale and C.H. Hull, Statistical Package for the Social Sciences, New York: McGraw Hill Book Company, p. 217.

2. Spearman's Rank Order Correlation Coefficient

The Spearman procedure is applied to measure similiarity between two sets of ranked data and arrive at a correlation coefficient.

The computations were computerized on the basis of the formula:²

$$R = 1 - \frac{6 \sum_{i=1}^N (x_i - y_i)^2}{N(N^2 - 1)}$$

$(x_i - y_i)^2$ = square of the difference in each pair of ranks

N = number of pairs (judges who have ranked)

²S. Spiegel, Non-Parametric Statistics for the Behavioral Sciences, New York: McGraw Hill Book Company, 1956.

3. Chi-Square Test

Chi-Square analysis is employed in two contexts, one is an inferential procedure to test whether a frequency distribution differs significantly from a distribution that can occur by chance, the other is a measure of association to test whether two frequency distributions are significantly different from each other.

In the instances in which two frequency distributions are involved, the use of Chi-Square as a measure of association and as an inferential statistic, coincide for reasons of logic. If the Chi-Square Test reveals that the distributions do not differ, this can be interpreted as association between them.

In instances in which more than two frequency distributions are involved, the Chi-Square Test could only be employed to test whether the distributions differ from what could be expected by chance. In cases of more than two distributions, the Chi-Square Test cannot be interpreted as a measure of association.

The computations were computerized according to the formula:³

$$\chi^2 = \sum \frac{(O - E)^2}{E}$$

O = observed frequency

E = expected frequency; $E = \left(\frac{cr}{N}\right)$

c = number of columns

r = number of rows

N = total number of observations

³N. Nie, H.B. Dale, and C.H. Hull, op. cit.

4. Binominal Distribution

(With large number of observations is approximated by the Normal Distribution)

The percentage entries are each tested as to whether they fall into the significance interval at 0.05, according to the formula:⁴

$$\hat{p} - z\left(\frac{\alpha}{2}\right)\sqrt{\frac{\hat{p}\hat{q}}{N}} < p < \hat{p} + z\left(\frac{\alpha}{2}\right)\sqrt{\frac{\hat{p}\hat{q}}{N}}$$

p = mean

q = standard deviation

N = number of observations

\hat{p} = observed value

$z \pm \frac{\alpha}{2}$ = percentage area that lies within the specified interval around the mean in the distribution, in this case 95 percent.

⁴Morris Hamburg, Statistical Analysis for Decision Making, New York: Harcourt Inc., 1970.

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