Higher Secondary Education and Its Vocationalization

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FOREWORD

It has been accepted in our country that reorganization of higher secondary education and especially its vocationalization are essential if education has to play a positive part in national development and social change. But there is a long and difficult transition between accepting this in principle and implementing it in practice. This is so because the new demands not only require an internal restructuring and modification of content in education, but even more require strong links to be developed between education or the school, and the departments, agencies and enterprises concerned with "development" — such as industries and commerce, agriculture, health and community development. New consciousness and thinking are, therefore, needed both among educationists and the leading people in these other spheres of life.

It is precisely to develop such a joint approach and thinking on the problem of vocationalization of secondary education that the NCERT circulated a draft document in April this year, setting out a model for implementing the scheme. This was followed by a national conference in June attended by a number of Vice-Chancellors, Education Secretaries and DPI's of States, representatives of Boards of Secondary Education and Ministries concerned with Education, Health, Agriculture, Labour and Industries, etc., besides a number of other distinguished educationists. The issues were thoroughly discussed and a large measure of agreement was arrived at. The Curriculum Committee, initially set up by the Ministry of Education and later enlarged and supported by the NCERT, was entrusted to finalize the document. The Curriculum Committee again met on 1 September and, after careful consideration, accepted the ideas as presented here.

It is our plea that vocationalization is a major transformation in education and cannot be achieved without important structural and functional changes in the whole set-up. The most significant changes have been spelled out in this document which now presents a balanced and coherent picture of what has to be done. It is hoped that the document will prove to be a useful practical guide to the States in restructing their higher secondary education. The National Council of Educational Research and Training is preparing other

materials pertaining to the district surveys, identification of important vocational courses, details of syllabi and patterns of organization for cooperative inter-agency action to help the States implement the scheme. We hope that with the States coming forward to take important decisions in this field, there will be concrete progress in the next one year.

RAIS AHMED
Director
National Council of Educational Research and Training

New Delhi
18 September 1976

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Higher Secondary Education and Its Vocationalization

1. Diversification and Flexibility

1.1. The general objectives of school education have been stated and explained in the document *The Curriculum for the Ten-Year School—A Framework*, which was published by the NCERT in November 1975.

1.2. The characteristic feature of the last two years of schooling (called the higher secondary) is *diversification*, the aim of which is to avoid forcing students into the academic channel alone and to offer them opportunities to choose subjects and programmes of study in a much wider field of education in keeping with their aptitudes, interests and abilities, with a view to increasing their employability which would, in turn, provide society with personnel having a wide spectrum of knowledge and training for its own needs and upliftment. It also aims at the reduction and elimination of frustration among the youth resulting from the non-productive and aimless education offered at present. With the programmes of universalization of elementary education eventually flowering into widespread general education up to Class X, if diversification does not take place, we would be faced with the problem of having to greatly expand tertiary education of the academic kind, with consequent expenditure, on the one hand, and the danger of unemployment, on the other. Therefore, there is great urgency for designing a diversified higher secondary education in which the academic stream would cater to not more than about 50 per cent of the students at the higher secondary level. A necessary feature of the higher secondary education would, therefore, be the provision of a large number of vocational streams which would generally be terminal. The system itself would, however, be so designed that a student may be allowed to transfer from the academic to the vocational stream, and vice versa, without having to start in the other stream from the very beginning; there will also be provision for pursuing some of the study through part-time and correspondence courses.

1.3. The academic stream would also be terminal but, on the other hand, it may be a feeder for the tertiary level of education and,

as such, it will have to be designed to match the educational achievement expected at the level of Class X, on the one end, and that required to enter the tertiary level of education, at the other. Here, a choice of subjects will have to be provided for, not only in accordance with the aptitudes and interests of the students, but also in keeping with the admission requirements of the tertiary-level institutions which some of the students may wish to enter. The term 'choice of subjects' cannot mean a choice, for example, between mathematics and biology or between history and economics, since by such a scheme many interdisciplinary areas are likely to be left out and students would be faced with the problem of either studying a 'subject' for two years or not at all. In fact, a student of biology may benefit if he could study at least part of mathematics (say, statistics) or if a student of history could study some relevant portion of economics.

1.4. An essential feature of the design of the higher secondary system is *flexibility* which would allow the desired diversification of vocational and academic courses to be effected. If flexibility is not a part of the +2 system of education, student choices in accordance with aptitudes and social needs will be restricted, transfer from academic to vocational courses, or vice versa, will involve undue loss of time, and the possibilities of combining periods of full-time and part-time study with work will practically disappear. The educational system will be reduced, more or less, to what it is, and, hence, the problems of irrelevance, unemployment and frustration will continue.

1.5. Flexibility can be ensured by adopting the semester and credit system of courses (please see Appendix 1 for details). The conventional subjects like economics or chemistry will be broken into a series of 'courses' of one semester's duration, and so will be the vocatioal subjects in the field, say, of agriculture or industry. A semester course in 'agricultural economics' or 'industrial chemistry' can, therefore, be taken up for study both by students pursuing academic studies and students pursuing vocational studies. 'Credits' for various courses studied would then be entered on a student's school card, and even if he changes from one type of study to another, or from one institution to another, he can be given due recognition for what he studied earlier.

1.6. The question may be raised that our 'academic' system at present is not familiar with the 'semester and credit' type of organization of courses. This familiarity must, therefore, be brought about by a well-directed effort within a short period of time. If the lack of familiarity today is used as an argument for introducing this essential change later on, then the danger is that the change will not take place and vocational

programmes may start failing for the very reason of being 'inflexible'. Hence, where higher secondary education is being reorganized to serve new personal and social needs, it is necessary to provide for (*i*) a wide choice of combinations of courses ; (*ii*) transfer from a programme of vocational studies to academic studies, and vice versa ; (*iii*) 'bridging' and remedial courses which may enable students, who cannot find suitable outlets in one direction, to move on in another direction of studies, or enter tertiary institutions ; (*iv*) interruption of studies, and part-time studies or correspondence studies combining with work ; (*v*) transfer from one kind of institutions to another ; (*vi*) varying durations of some of the vocational courses — between $1\frac{1}{2}$ and three years — and this can hardly be done through the two-year-long subjectwise courses and associated annual or two-year examinations. The change-over to and adoption of the semester-credit system may not be a pre-condition for introducing vocationalization of education, but it is a commitment and must be taken as such.

2. Schools for Academic and Vocational Courses

2.1. A number of decisions have to be taken about the conversion of high schools into higher secondary schools providing the +2 years of education. The Education Commission noted that higher secondary education properly belongs to the school and recommended that all those institutions which are at present offering +2 education, whether it is being provided in tertiary institutions, or separate junior or pre-degree colleges, may continue to exist to avoid confusion and reduce administrative difficulties to the minimum. In all such cases, the staff must be clearly demarcated as school staff and provided in accordance with school norms. The weaker secondary schools should certainly not be converted into higher secondary schools.

2.2. The overall position, roughly, is that, taking the entire country, the number of high schools is three times the number of higher secondary and preuniversity institutions or inter colleges, etc. According to the Third Educational Survey (1973), we had 32779 high schools and 9743 higher secondary institutions. The position in West Bengal and Uttar Pradesh was that these two categories of institutions were in equal number. In the States and Union Territories, there are only 11-year schools. Similarly, the number of degree colleges is about a third of the number of higher secondary institutions. The enrolment figures for Classes IX and X are also about three time those of Classes XI and XII. Thus, on the average, the number of schools for higher secondary (+2) education should be a third of the number of high schools. The decision about converting the 10-year schools int 12-year schools or breaking the 11-year schools into 10 and 12-year schools may roughly follow this pro-

portion, paying due attention to the balance between urban and rural populations and schools as well as prevailing local conditions.

2.3. While ultimately all higher secondary institutions should have both academic and vocational streams so that there is economy of effort and availability of a wide range of course programmes, during the Fifth Plan at least three or four schools in each district should be provided with facilities for relevant vocational education. In the Sixth Plan, we may strive to reach the target of vocationalizing practically the whole of +2 education, covering about as many students by the vocational courses as by the academic courses.

2.4. The choice of schools for upgrading from 10 to 12 years should be based on 'external' factors, such as the important vocations and suitability of the location of the school for those vocations, and also 'internal' factors such as the number of students in the various streams, and thereby the size of classes, and the need for classrooms, work-rooms and staff, etc. The required flexibility would become very expensive to provide, if the numbers involved in a group of connected vocational streams fall below about 60 ; they should better be around 100. Thus, combining (academic and vocational) students in equal numbers, an admission capacity of between 120 and 200 may be the target.

3. Admission and Streaming

3.1. Admission to the higher secondary level has to be based on a balanced consideration of the needs of the individual and those of the society. The individual cannot have unlimited freedom in choosing his course of study, since, if his choice lies beyond what the society has a capacity to absorb, the individual will only be frustrated at the end. Society cannot impose its choice on a student since he cannot make his optimum contribution to society under such conditions of study. Therefore, a careful decision has to be made at the point of entry to higher secondary education, involving (*i*) a student's abilities, aptitudes and aspirations; (*ii*) the needs of the society as reflected in the requirements of developing economy where the student may find scope for post-educational activities; (*iii*) the imperatives of ensuring social justice and equality of opportunity for those who have been traditionally handicapped in the field of education. The question of social need will be examined in greater detail in section 5.

3.2. In the curriculum for the ten-year school*, a certain pattern of examination has been recommended after a nation-wide discussion.

* NCERT, November 1975.

Some progress has been made in the various States towards adopting that pattern, although much more needs to be done, and urgently so. It may, therefore, be expected that in the very near future, a student's results will be available in the form of a table indicating semester courses that he studied and the grades he obtained in them. An internal assessment card may also be available separately or grades in that sphere of activity may be available in the result card. This information would be submitted by a student when he desires entry to any higher secondary institution, and he must further be required to state what programme of study he wishes to follow and with what career as his option. The natural procedure would be to have this information analysed at the school level where the programmes offered are known*, and if the school has the capacity to admit all those applying for admission to the programmes they desire, they may be admitted.

3.3. In most situations, however, it may be the position, at least for a few years, that most of the students opt for conventional academic courses, in many cases leading to tertiary-level studies in engineering, medicine, or business administration, etc. In such a situation, consideration of merit in relevant school subjects becomes a factor to be considered, together with the need to safeguard the educational interests of sections of our people in certain ranges of income and in certain regions who have been deprived of suitable educational opportunities. It is only just that for some time reservation of at least 20 per cent of seats in prestigious courses may be made for students of this category. The recommendation for reservation is in keeping with various other steps that are being taken to ensure equalized opportunity to all sections of our people. Educational authorities must devise a system of exercising this reservation which may be fair to those who stand in the maximum need of such support. In the case of reserved as well as unreserved seats there should be an admission test for candidates who are considered eligible — and the word 'eligible' should be carefully applied. (For example, a student who may have done poorly in mathematics in secondary education may not be prevented from studying Hindi literature, history, geography, sociology, political science or other non-mathematical subjects at the higher secondary level). It is desirable that such tests may be organised by educational authorities at the district or sub-regional level, where necessary, so that they may have greater credibility. The tests themselves need not be too elaborate, running into several 'papers' for a number of days ; they may consist of one or two suitable papers of two hours' duration.

* Programmes offered by schools would be decided as stated in section 4. The number of seats would be decided by educational authorities.

3.4. Thus, it may be visualized that the admission of a candidate will be for some selected programme of study ; he may belong provisionally either to the academic or the vocational stream. At the end of the first semester, when the performance of the student in the assigned course units is known, he may apply for a change from the vocational to the academic stream, or vice versa. Such adjustments should be made as far as possible, keeping in view the size of classes, classrooms and other facilities of the school. At this stage the assignment in a stream should be confirmed, and at the end of the second semester only a few further changes in really deserving cases should take place. This is because a clear direction of studies should be established at least midway in the course so that the student may, with singleness of purpose, apply himself to learning and training in the course.

3.5. It is obvious that higher secondary institutions will have to provide guidance and counselling for careers and courses to the students both at the point of entry and at the end of semesters. This does not imply that one particular teacher will have to be entrusted with this work ; instead, practically all teachers should be familiar with arriving at a profile of a student's personality, interests and capabilities on the basis of a school record of internal assessment and semester course grades. They should also be familiar with employment and work opportunities associated particularly with the vocations for which there is provision in the school. Advertisement about the choice of courses can then become a rational matter which students and their parents will trust and accept.

4. Choice of Vocations : District and State Councils

4.1. Much thought has to be given to vocations for which facilities have to be provided and to selecting schools where these vocational courses should be provided. Since the aim of vocationalized higher secondary education is to provide that education which allows a student to contribute his best to the development of the society around him, and to employ his skill to his own satisfaction and that of the society, it should be possible to select vocations in which there are or are likely to be employment opportunities in a given district or a set of districts. When one speaks of employment here, one also includes self-employments and entrepreneurship. The occupational pattern of a district or a set of districts has, therefore, to be studied ; obviously this pattern will not remain static and, therefore, the system must always be ready to give up preparation for one set of vocations and to take it up for another set of vocations.

4.2. This leads us to several questions. One is : how should the vocations which are relevant in the above-mentioned sense to a particular

locality be studied on a continuing basis and be reflected in the choice of courses ? It seems that since people who would get vocational education at the +2 level have limited opportunities to move on an inter-State basis, and only a marginal opportunity to move from one group of districts in a State to another (this is based partly on salary structure at the moment), it is obvious that the unit for considering the relevance of vocation has to be a district or a group of districts. Next, one will have to take into account the productive and commercial activities in the area, namely, the types of trade, agricultural production and movement of commodities, ancillary activities such as workshops, construction works, educational research and development instructions in the area, etc. The set of vocations likely to come up in the immediate future would be most important and they can be taken into account if the State Plan proposals pertaining to the districts concerned are known. Besides the vocations which may be based on the existing activities, it should be possible to think of other profitable and productive ventures which may be undertaken in that area for the well-being of the community and the growth of economic activity. The ideas of appropriate technology, labour-intensive and employment-generating cooperatives and small-scale enterprises may be given concrete shape in proposing activities for a group of districts or a region, thus coupling education with productive activity, and making it feasible to construct the future in accordance with the socio-economic ideas we have been placing before the people. A survey of activities of this kind would lead to the identification of vocations which are likely to have relevance, and to the identification, generally, of the number of persons that would be needed. It would be necessary to group these vocations into families because, as explained elsewhere, the purpose of vocational education is not to train individuals for any specific vocation (since in the event of not finding employment in that particular vocation, one's training would be wasted). The training has to be for a family of vocations which will have to be identified.

4.3. The vocations identified in the above-mentioned manner may be the first ones for which facilities would have to be created in the higher secondary institutions, but the changes in vocations with time can only be taken into account, if the district or the group of districts has a standing committee for vocational studies in which representatives of productive activities and services, trade and commerce, administration, planning and educational institutions take part. Such standing committees or District Vocational Committees would be most useful not only in deciding upon the vocations for which facilities should be provided from year to year, but also in deciding on the content of the vocational courses, and more than this, the manner of facilitating training in these vocations by the cooperative participation of the above-mentioned agencies. The

Committee itself should be presided over by a distinguished educationist, or an industrialist, or an administrator of the district who commands respect and influence to bring about happy cooperation among all agencies, including educational institutions. We visualize a District Vocational Education Officer to be the Secretary of the Committee (and with a small staff) to follow up the decisions with appropriate action. The preparation of the curricula, however, should be entrusted to experts at the State and national levels so that a desirable blending of the educational and training aspects is brought about.

4.4. Since there may be a shifting pattern of vocations, it is important to realize that substantial hardware and firm facilities should be created only for those vocations which have a longer span of life ; for others, as far as possible, existing facilities of educational or other enterprises must be utilized and teachers or instructors should be engaged on a part-time basis from amongst those who have expertise in the vocations even though they do not have formal university-level degree or teacher's training certificate. The institutions which could become centres of vocational education include those which already exist in many places, for example, health and agricultural schools, the polytechnics, the ITIs and the industrial or other centres where training facilities for apprentices exist. Institutions belonging to different departments of the government, public enterprises and private organizations will have to be harnessed by the State Governments so that the costs of vocationalization do not mount, at least in part, owing to the duplication of facilities. Large public sector undertakings and workshops, such as those belonging to the railways, could be made to take positive steps to adopt higher secondary schools for teaching and training in certain fields. The government could consider involving these and some private sector industries and undertakings in education through proper legislation.

4.5. Vocations which have a long span of life and which call for very specific hardware should not be dispersed on district basis ; but once the need for them has been identified by district-level surveys and the full picture is available for the State, it may decide to establish full-fledged vocational institutions, perhaps combined with academic streams, in selected centres in the State. For example, facilities for various kinds of para-medical training may be put in a few centres in a State adjacent to medical colleges and hospitals where part-time teachers would be available and apprenticeship would also be possible. The same holds good for some agricultural and technological vocations and so on.

4.6. This implies that vocationalization of education would require

a district-wise survey of economic activities and potentialities and consequent opportunities of work, or some kind of micro-planning at the district level and assessment of manpower needs. It would also require a compilation of the picture for the whole State and the taking of a series of decisions about the location of vocational courses of various types. The States would thus, have to establish, besides district-level committees for vocational studies, a State Vocational Education Board or Council which would carry out a number of functions, including the coordination of the use of facilities in all establishments in the State. This is in accordance with a recommendation of the Central Advisory Board of Education (CABE).

5. Particular Features of Vocational Education

5.1. It may suffice at this stage to mention that the Unesco, in its recommendation of 1974 on Technical and Vocational Education, defined it as a "comprehensive term embracing those aspects of the educational process involving, in addition to general education, the study of technologies and related sciences and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in the various sectors of economic and social life. Such an education would be an integral part of general education and a means of preparing for an occupational field and an aspect of continuing education. Technical and vocational education should further contribute to the achievement of society's goals of greater democratization and social, cultural and economic development, while at the same time developing the potential of the individual for active participation in the establishment and implementation of these goals. It should lead to an understanding of the scientific and technological aspects of contemporary civilization in such a way that men comprehend their environment and are capable of acting upon it, while taking a critical view of the social, political and environmental implications of scientific and technological change. Given the necessity for a new relationship between education, the working life and the community as a whole, technical and vocational education should exist as a part of a system of life-long education adapted to the needs of each particular country."

5.2. Thus, it is seen that vocationalized higher secondary education cannot be equated with mere technician training; it is essentially education in the broader sense of the term. It prepares and cultivates the individual to understand the social reality and to realize his own potential within the framework of economic development to which the individual contributes. Education does not produce jobs, but vocationalized education makes it more likely for an individual to get a job or to be his own master by either starting a new productive activity or a service which

may satisfy a felt need of the community. By broadening the educational horizons for the individual it enables him to reach higher levels of achievement through self-learning.

5.3. In a country where industrial and agricultural production is growing, where the application of science and technology opens up diverse fields of activity, where commerce and trade and a large variety of public services are expanding rapidly, there must be an adequate supply of personnel for the higher administrative and professional levels, as also of unskilled and semi-skilled manpower for the lower levels, but there is a crucial middle level of manpower trained in certain specific competencies without which neither production can be increased nor services improved. If health services have to function and benefit the common man, the doctor alone can achieve nothing, unless the drugs and instruments are manufactured and hospital facilities established to reach every nook and corner of the country. This focuses our attention on the variety and number of technical people manning the productive medical enterprises on the one hand, and a host of para-medical and technical people who make it possible for a hospital to function—from those who take the X-ray or conduct pathological tests to operation-theatre technicians, physiotherapists, orthopaedic assistants, and so on. In agriculture, commerce and the string of cultural and welfare services, this middle-level personnel is of the utmost importance for the very existence of a modern society. Deficiencies, either in number or in training of personnel, for these vocations lead to poor maintenance of equipment, material and services, to frustration for the users and high infructuous costs to the country.

5.4. In India, although agriculture is and will remain for decades to come the mainstay of our economy, we have in the past been concerned mainly with industry-cum-city-oriented vocations. Facilities and services in rural areas have remained generally backward so that the city-trained doctors, engineers and even technicians do not find it sufficiently attractive to settle and serve in the rural areas. Special attention, therefore, has to be given to improving the facilities and quality of life in rural areas, which implies development of particularly those vocations which have the potential of better utilization of agricultural resources—from the servicing of tractors, tubewells or other machinery to vocations based on dairy/fruit/vegetable/horticulture/medical plant/products, or those connected with rural health/educational/cultural services. Therefore, in a sense, vocational education has the potential of enabling us to really move towards an equitable sharing of the benefits of economic development and towards social justice.

5.5. It is at once obvious that the proper preparation and nurture of people for these vocations involves general education of good quality blended with specific training in skills. By their very nature these vocations often need 'mixed' technologies or a mix of technology with agriculture or science or commerce or other disciplines. The vocations are not always very clearly definable, and hence the necessity of supporting the training component with knowledge of the concerned basic disciplines. The rather rapid change in technology would also point towards the need for flexibility in course structures combined with emphasis on basic disciplines. The close relation between education and socio-economic development again places emphasis on the vocational student being imparted an understanding of our social reality and an appreciation of the national policy towards development of self reliance and equitable distribution of benefits. Thus vocational education is a challenge to the country as it is to the individual who enters upon it, and this is the only guarantee of this vital sector attracting good enterprising students.

5.6. Practical work and training are very important components of vocational education, since, obviously, it is intended to produce people who could work with their brains as well as their hands, who could translate ideas into hardware, who would not be merely the 'superiors' of skilled workers but could interact with them to produce new goods and services. The proportion of time spent on this activity will depend on the nature of the vocation, but it should certainly be enough so that the student produced may become eligible to enter the trade for which training is given.

6. Pattern of Courses for Academic and Vocational Streams

6.1. With the above-mentioned framework of vocational education and the more familiar framework of academic education, and, further, remembering the necessity of providing bridges between the two, the following pattern and division of time are suggested :

A.	Language General studies (social, economic, scientific, etc.)	25% time for all streams
B.	Science, social science, humanities, including literature	75% time for the academic stream. Students may offer course from (C) also
C.	Science, social science and humanities courses designed to explain the basis	25% time of the vocational stream

	and scope of various vocations	
D.	Vocational and practical work	50% time of the vocational stream

6.2. The allotment of time for category A is done in such a wayay that there may be some flexibility in apportioning it between language annd general studies. It is suggested that language may be taught to devellddop facility in reading, writing and speaking fluently, and in taking part i in communicating ideas with clarity and precision. It is desired that noone of the two components of category A may be given less than 10 per ceent time. Students in the academic stream would be able to study courrses from category B or C in accordance with a few rules of combination annd with the help of a course adviser. This is to ensure that meaningless choiicces are not made by students. As far as the nature of courses in categoriies B and C are concerned, there would only be a difference in emphaisis. For example, directed towards a group of agricultural vocations, categoory C may have soil or fertilizer chemistry or the chemistry of pesticidides, fungicides, etc. It may have courses on biology emphasizing pllaant pathology and growth stimulators, or courses in agricultural economiiccs, or land use or even the law concerning agricultural possession. Suach courses should naturally be given credit as 'academic' courses whaen students of the academic stream are allowed to take them, and thaey should likewise be given full credit on the academic side when a studeent of the vocational stream takes them and is allowed to enter the academmic stream. Thus, roughly 50 per cent of the courses are 'common' wiith transferable credits. Courses in category D should be mostly of a practiccal nature—here theory should be at the minimum. The laboratory, the workk-shop, or the field should mostly be the base, rather than the classrooom for these courses.

6.3. Courses are to be designed as semester courses in each subjeect and since +2 is mostly terminal (only sometimes a feeder), they miay have a 'modular' or add-on character. That is, in each subject there miay eventually be a few core courses of semester length in category B ; thien there may be one or two advanced courses in category B which studemts wishing to go on to the tertiary level may take ; there will also be one or two 'applied' courses in the same subject falling in category C to lbe generally taken by the vocational-stream students.

6.4. In the matter of language, the schools should provide for at least two languages, although a student may take any one. If a student has studied the regional language and has also studied in a school where

tthe regional language was the medium of instruction, there does not seem tto be any advantage in forcing the student to learn that language further. ((Of course, he can study it as an optional in category B.) He may benefit ffrcm learning another language and, in particular, learning the language wwhich may be the medium of instruction where he is studying or where lhe is likely to study. The option of studying an Indian language other tthan the regional language should be available, if possible. If possible, tthe schools should provide additional courses for learning English so that tthe deficiencies which a student has at the high school level may be removed, and he may become proficient in utilizing this language for furtther learning, particularly at the tertiary stage. Some schools would find iit possible to provide the facility for learning a foreign language other tlhan English. The stress should be on developing language and communication skills, using modern methods of teaching.

6.5. The general study is meant to be a series of courses from which a student may offer the equivalent of about 15 per cent of the total load. For example, if he has to complete 140 credits in two years, he may offer about 20 credits in the sphere of general study. The purpose is to enlarge tthe awareness of the students regarding our culture and heritage, our history and the problems of growth and development of our society. The sttudies up to Class X already involve some of this but the two years which a student (from 16+) spends at an institution of higher secondary education should be used for a discussion of the above-mentioned problems im a very mature manner. It is not visualized that there will always be lectures on these subjects. In fact, well-conceived discussions and seminars, with suggested readings for students (and, of course, provision of tthe books on these subjects in the library), would suffice if these are accompanied by suitable internal assessment and terminal examination.

6.6. In the report of the Education Commission, there is emphasis om work experience at this stage of education. It has been included as a subject in the scheme of things represented above but it is stated that emphasis on work experience must be compulsory for the academic stream students, and it should preferably take the form of planned involvement in actual productive activity. It should be possible to arrange for these students to spend at least a month every year on farms, in factories, workshops, and offices as student apprentices. Working in an actual working-situation provides insights, particularly through interaction with other working people, into the problems of social and individual life which cannot be obtained from books alone, and that is why this is strongly recommended.

6.7. In the vocational sector, the basic sciences concerned with a

vocation are necessary, since the intention is not to produce a man with only manual skills ; if this is done, the course would be attractive even for many intelligent students. Therefore, suitably developed courses in biology or chemistry or physics and/or mathematics, commerce or economics concerning the vocation have to be taken. Of course, if a student transfers from the vocational to the academic stream, he will carry the credits for this study as also the credits for language and general study. The purpose is that while 50 per cent of a student's time in the course is spent directly on learning the skills, the operations and the technology of the vocation, he spends some time on understanding the broad social and scientific framework in which that particular vocation operates. It is hoped that he would be able to take responsibility in his vocation more intelligently if he has such a knowledge base.

6.8. Work-experience activities are not being proposed in the vocational sphere because 50 per cent of a student's time would have to be spent on properly designed vocational studies which would definitely involve considerable practical/laboratory/field work and apprenticeship in relevant enterprises. On-the-job training would be a 'must' in most of the vocations and the school time-table would have to be so designed as to meet that situation.

7. How Can Part-time Studies and Other Courses be Integrated into the System ?

7.1. The semester course and the cumulative credits system which have been suggested would allow for part-time study to be made at the higher secondary level, and institutions should encourage this as far as possible. They must offer courses for students changing institutions, or remedial courses for those who come from either backward regions/communities or belong to the Scheduled Castes and who are for any other reason in need of such courses. On the other hand, some additional courses of a high level may also be provided by institutions for students who, from any of the two streams, wish to do more than what is considered normal. It would be very desirable if a system of correspondence courses is developed which may be linked up with the institutional courses in a complementary way so that part-correspondence and part-study courses may also become possible. The laboratories and workshops of the institutions, particularly the vocational institutions, should be made available during the vacations and during holidays for non-formal education which will have to be organized in the States through, perhaps, another agency.

7.2. Correspondence courses and contact programmes may also be organized for those skilled artisans and craftsmen who are proficient in their trade but who lack general education and other relevant knowledge,

to either improve their competence or their trade. The Unesco report suggests that the "development and expansion of technical and vocational education as continuing education, both within and outside the formal education system and within the framework of life-long education, should be a priority objective of all educational strategies. A broad provision should be made for allowing everyone, whatever the educational qualifications achieved prior to employment, to continue professional and general education. In addition to permitting adults to make up deficiencies in general and professional education, it should offer possibilities of personal development, professional achievement and should permit updating and refreshing knowledge and practice in an occupational field."

7.3. One of the main drawbacks of the present vocational courses is the near-absence of opportunities for the students to further improve their qualifications and competencies in suitable higher vocational institutions, and of vertical mobility in general. If any student, who completes higher secondary vocational education and enters a profession or starts his own enterprise, should desire to come back to improve his knowledge or prospects, specific courses should be available to him in selected institutions such as polytechnics or engineering and medical colleges. If such opportunities are assured from the very beginning, he will not hesitate to join the vocational courses and enter service, postponing temporarily his ambition for higher qualifications and professional status.

7.4. In fact, if one examines why high-level professional people like doctors or agricultural scientists are unable to work in rural areas where their services are needed one may strongly recommend that those students who come out of vocationalized higher secondary education and who actually serve in rural areas, say, for five years, should be given special consideration in admission to tertiary-level professional institutions, in some cases, at the expense of the government or institution. Para-medical personnel or technical personnel graduating from +2 institutions and serving in rural or urban areas for a given number of years may be allowed to compete for at least 15 per cent of the seats in medical and engineering colleges, and those who are selected for further study may be given some bridging courses. This will not only be an incentive for vocational education, and for those who serve the people, but will bring about a change in the classroom atmosphere of these institutions by the presence of students with practical experience. The present system of allowing entry to tertiary-level of education on the basis of scholastic performance is really responsible for a large number of students opting for such courses, and for the remaining pursuing purely academic courses. It may be realized that the testing of 'merit' in this manner results in arbitrary judgement. If particular skills, aptitudes and attitudes

are properly tested, there is no doubt that students in the vocational stream will be able to compete on equal terms in the selection tests.

8. Teacher Orientation for the Vocational Stream

8.1. Courses in categories A, B and C can be handled by those who hold a Master's degree in the subject concerned, followed by a teacher training programme, but the more important issue is that all the teachers for the vocational subjects in category D on which students spend about 50 per cent of their time should possess basic vocational qualifications and expertise themselves. It has already been suggested that part-time teachers and instructors (like doctors or motor mechanics) should be freely obtained from amongst those who are in the concerned vocation, even though they may not have a Master's degree or a teacher training certificate. The involvement of professional experts in imparting training for skills would bring them into closer collaboration with educational activities and offer them opportunities to appreciate the problems involved in institutional training and the need for the provision of facilities by various industries, agricultural farms, commercial organizations, hospitals, and so on. This collaboration would result in a very healthy participation, as a result of which the on-the-job training and employment of the trained personnel would generally improve. Needless to say, vocational programme in most cases will have to be organised by sharing the facilities of professional institutions, besides engaging part-time staff. It is in a sense a partnership programme between education and other sectors of the economy and the services, between the school and the factory or the firm, so to say. The relative numbers of such part-time staff would vary from one family of vocations to another and no standard mix of trained and untrained teachers can be suggested. However, in the vocations some full-time teachers with adequate qualifications may have to be appointed to teach as well as to coordinate the work of the part-time staff, and even to locate and identify the need for the part-timers. It is difficult to spell out in greater detail their qualifications without reference to each family of vocations, and without consideration of the availability of persons at the salaries prevalent in the school system. In agriculture, for example, M. Sc. (Ag) degree holders may be available and have only to be trained; in medicine or technology, it is doubtful if M.B.B.S. or B.E. degree holders would be available. In commerce, again, M.Com. degree holders will be available. Hence, one may say that teachers for full-time appointment should be those who have about four years of education in the relevant profession after 10+2. An important issue is that all full-time teachers in higher secondary education should be treated at par with each other — the insistence on purely academic qualifications will often adversely affect the vocational staff. It is obvious that special teacher training or orientation programmes for this sector of education

will have to be be designed, including not only pedagogic training but sometimes training in specific skills and technologies. The part-time staff of even highly qualified professional people would require some orientation in instructional techniques and evaluation. This orientation may be provided at a few centres. The full-time teachers would require periodical re-training to keep them abreast of the latest practices, and for this also the sympathy and cooperation of the industries and other organisations are absolutely essential. After all, the educational activities and economic and social development have the common aim of making the society more prosperous and dynamic. However, it is also to be appreciated that at the earlier stages, it would be impossible to supply adequately qualified and trained teachers on a permanent basis in a large number of specialized fields. Teacher training takes time and the country can ill-afford to wait until such teachers are available in sufficient numbers. A compromise between what is the best and what is immediately needed has to be agreed upon and adopted in the larger interest of the country.

8.2. In this connection, it may be appropriate to mention the need for the preparation of textbooks and related material for the vocational courses. Since the standards and scope involved here would be different from those in the tertiary or professional education stages on the one side, and purely technical training on the other, a great deal of textual material will have to be prepared for the various vocations. When the vocational courses themselves are drawn up, it would be worth-while to see what books already exist in this field and what kinds of books have to be prepared.

9. Evaluation and Recognition of the Courses

9.1. One of the major issues engaging the serious attention and thought of the educators is the system of examination we are following in all the educational institutions. In the proposed educational system at the higher secondary level, a bold attempt has to be made to dispense with the public examination system and to adopt a system of continuous evaluation. The full-time teachers should be oriented to evaluating their own students. Training would have to be imparted in the factories, on farms, in hospitals, etc., and reliance will of necessity have to be placed on the judgement and evaluation of the concerned staff. A system of checking and supervision (perhaps joint examiners) will have to be developed to maintain high standards of performance. Administrative difficulties may arise during the implementation, but they have to be solved with imagination and through persuasion and with firmness.

9.2. The form of examination being suggested would lead to a

result card showing the various semester courses/training received by the student and the grade — a seven-point grade — obtained in each course. Delinking of courses and opportunities to improve grades later on are part and parcel of this system. It may be emphasized that such a result which is dictated by the various practical considerations of the +2 system involves that tertiary institutions will have to hold their own admission tests, or the State may have to hold an entrance test for them. In medicine and engineering, this is already the widespread practice, but in other faculties, if the number of students desiring admission exceeds the number of seats, the practice of holding a test will have to be adopted. Even pedagogically, this should be a welcome change since the aptitude and the discipline background needed by each faculty like science, arts and commerce, etc., are different.

9.3. Another issue to be grappled with at this stage is the establishing of equivalence among vocational diplomas and certificates issued by various agencies and the according of recognition for the purpose of training and employment. This is crucial especially when several agencies, old and new, will be awarding diplomas and certificates. New diplomas or certificate holders should have equal opportunities of selection with those coming from polytechnics, etc. This is the appropriate sphere of work for the National Council of Vocational Education.

9.4. We have emphasized elsewhere that considerable flexibility would be built into the system in regard to the duration of education and training. Some of the courses might be of two semesters' duration, some of three or four semesters and some others even of five or six semesters. Therefore, there will not be one rigid system for two years' (4 semesters) education at the +2 stage and the "+2" is only notional. Therefore, the students who would be educated and trained over different intervals of time will have to be assessed differently and the appropriate equivalence of courses of nearly equal duration offered in all the vocational institutions should be established. For example, a student who undergoes a course of six semesters should have no difficulty in comparing his diploma with that of the diploma issued by the polytechnic. It is only a question of the competence that the student has to reach before a certificate is awarded. It cannot be over-emphasized that, by and large, the employment opportunities dictate the choice of the type of education, especially at the higher secondary stage. The present tendency to acquire university degrees, without regard to employment conditions, is chiefly due to the prevalent practice of stipulating university degrees as minimum qualification for a variety of jobs which really do not need the services of graduates. On the other hand, the diploma or certificate-holders with adequate skill and competence can very well fit into

a large range of jobs. This aspect will have to be given due and urgent consideration and steps will have to be devised to impress this upon all appointing agencies. If this principle is explicitly accepted, it will be possible to attract a large section of youth to vocational courses. This incentive can be further advanced if a policy decision at the highest level is taken to offer equal or comparable salaries to the diploma- or certificate-holders as to the university graduates when skills in which the former have been trained are the basis of selection. A step in this direction has already been taken by adopting a resolution to ensure the above in a meeting of the State Education Secretaries held on 6 and 7 June 1975. It is hoped that the resolution will soon be implemented.

APPENDIX I

The Semester System

A semester is half an academic year, having about 90 workkiring days.

In the semester system, the duration of a course in any subject is coone semester of about 18 weeks. For example, in the +2 stage the subjectt t of physics may be intended to be taught for two years ; but in the semessttster system, it could comprise a number of 'semester courses' such as :

Ph. 1. Mechanics, including gravitation

Ph. 2. Wave motion

Ph. 3. Kinetic theory of gases and thermodynamics

Ph. 4. Electromagnetic phenomena

Ph. 5. Elementary structure of matter

Of these courses, Ph. I may be normally given in the first semesttter, Ph. 2 in the second, Ph. 3 and Ph. 4 in the third, and Ph. 5 in the fournrth semester. The arrangement could be changed.

Grades and Credits

The performance of a student may be indicated (through internnal assessment and terminal examination) by a grade awarded in each semesstter course. The fact that a student has completed the requirements laid dowwn for a course is indicated by the award of 'Credits' for the course. TThe 'Credits' may be counted in different ways, but a common way is to assiign a number such as 2 or 4 to a semester course depending on how muuch time is devoted to the course. May be, if a course is taught at the rate: of 2 hours per week, it will carry '2' credits ; if another is taught for 4 hoours per week, it will carry a credit of '4'.

A student may get high grades in courses Ph. 1 and 2, and he mmay

get a very poor, unacceptable grade in Ph. 3. The credits of each of these courses may be '2'. The record of the student will show the following :

Course	*Grade*	*Credit*
Ph. 1	B	2
Ph. 2	A	2
Ph. 3	E	0

Cumulative Credit

Thus a student's course record would show his grades in the various semester courses he may have attended in physics, chemistry or whatever else it may be, and it would indicate his cumulative credit. In this system the rule for 'passing' the +2 stage or passing the higher secondary may be laid down by requiring the student to earn a certain total number of credits — it may further be laid down (if desired) that at least so many credits may be earned in physics, so many in mathematics, and so on.

The system, therefore, is very flexible; 'passing' requirements may be spelt out in a variety of ways ; a student is not forced into taking all the semester courses, say, in mathematics. He can, by academic advice or inclination, choose some semester courses in mathematics and leave some others in the same. Where a course A must be studied before one can follow a course B, A is made a prerequisite for being allowed to study B. Courses in laboratory, seminar or field work may also be visualized in a similar manner.

In the context of the present paper, this flexibility makes the semester system a 'must' for adoption. A student may transfer from the academic to the vocational stream, or vice versa, carrying forward his/her credits in biology or Indian history or economics. Another student may interrupt his studies and rejoin after one or two years — may be, join even a different institution — carrying forward the credits he/she has already earned. Some parts of a subject indicated by certain semester courses may be learnt by some one through a correspondence course, and these credits should also be added up when the student joins an institution. A semester record card or course card also shows a student's performance in more detail than the usual mark sheet.

The semester system does not compel one to abolish 'external' examinations ; but such examinations do not quite fit into the system. External examinations require dispersal of classes to accommodate an examination time-table, usually with preparation leave and 'gaps'. The

results of these examinations take long to compile. All this is time-consuming. (Perhaps two months is about the minimum between the end of one session and the beginning of the next.) If courses are delinked from each other so far as passing is concerned, the examination time for each stretches even further, making this facility difficult to operate. In the semester system, examinations, being held twice in a year, would prove counter-productive. If external examinations also have to be more 'general', since usually students of a number of institutions of varying degree of facilities have to be examined, they only establish the least common factor. These will tend to degenerate into tests of memorization of selected portions in the syllabus. There are, on the other hand, positive educational advantages in leaving internal assessment and terminal examinations to the teacher concerned. Therefore, there are strong reasons why the advantages of the semester system should be utilized to the full by using teacher-based assessment, both through the course and at the terminal assessment.

APPENDIX II

It is assumed that the students who successfully complete the 10-year education would be required to produce cumulative and final grade cards when they seek admission to higher secondary schools. Admission itself would be either decided on the grades obtained by the students throughout the secondary stage or on the results of separate tests conducted for the purpose. As an example, we may consider five students—P, Q, R, S, T—whose final grades in Class X in various subjects are as given below :

	P	*Q*	*R*	*S*	*T*
Hindi	A	C	D	E	C
English	C	A	E	D	C
Gujarati	D	E	D	D	E
Mathematics	D	A	D	E	B
Social Sciences	A	D	D	E	B
Science	C	A	E	D	D
Physical Education	B	C	B	C	A
Work Experience	C	B	B	C	A

From the grade cards produced by the five students it is noticed that P is very good in Hindi, social sciences and physical education although his grades in English and science are fairly good. Obviously, his aptitude for literature and social sciences is better than for science which requires a good grade in mathematics. If he has the ambition for the academic type of education at the tertiary stage, he should be advised to choose the humanities or social sciences group at the higher secondary stage. On the other hand if he desires to opt for vocational studies, he can select journalism or physiotherapy or printing because he possesses a strong aptitude for languages, social sciences and physical education.

The student Q exhibits an aptitude of high order for English, mathematics and science and is evidently a gifted student. He should be encouraged to select the science stream which will enable him to select tertiary education with the science subjects of his choice or any professional course of study such as engineering or medicine.

R is an average student whose prowess in English, mathematics and science is undoubtedly poor, but he is somewhat better in Hindi,

Gujarati and physical education. His achievement is best in physsivsical education, and he is probably a good sportsman. A further consultatioonn of his cumulative grade card may reveal that he has a special flair for vcovocational studies and will perhaps shape well if he chooses physical edulucation, printing, weaving or dress-making. He should be given a testt t for selection in the vocation/vocations of his choice before he is finnanally admitted. He should also be advised that his future is better ensureeced if he selects a vocational stream rather than an academic stream.

S is another average student whose grades in mathematics, scideience and physical education are better than those in the other subjects. IE Evidently, he is unlikely to make a successful student in the science strreream but has a fair chance of doing well either in a vocational course in 1 the technical area of agriculture or para-medical studies. He should be selelected for one of these courses, either according to his personal choice or r on the result of a test conducted for the purpose.

The last student T indicates that his achievement in Hindi, Enggglish, social sciences and physical education is fairly good but he can be clalassified among the average students. He may choose the commerce groupp in the academic stream where he is likely to benefit, but he has better chaances of making a good career if he elects a vocational course in business mamanagement or stenography or insurance. Again, suitable tests shouldd be conducted to find out his best talents and interests. Consultation of his cumulative grade card may further help in identifying his aptitude.

The foregoing discussion is meant only to illustrate a selection procedure. A variety of options would be open to the students but in any particular institution only a few options would be available; in such cases, the student should be advised to take advantage of the courses offereed in any one of the neighbouring institutions.

The above highlights the point that if further particulars of the candidates were available through semester-wise grades and resullts of internal evaluation (emphasizing such things as capacity for hard work, ability to consult library and other sources for studies, imagination, organizing capacity, manual skills, hobbies, and so on) the course advisers in higher secondary institutions would find it possible to help candidates in their choice of subjects. Hence, the recommendation in the paper regarding internal assessment is of great significance both for the students and the institutions.