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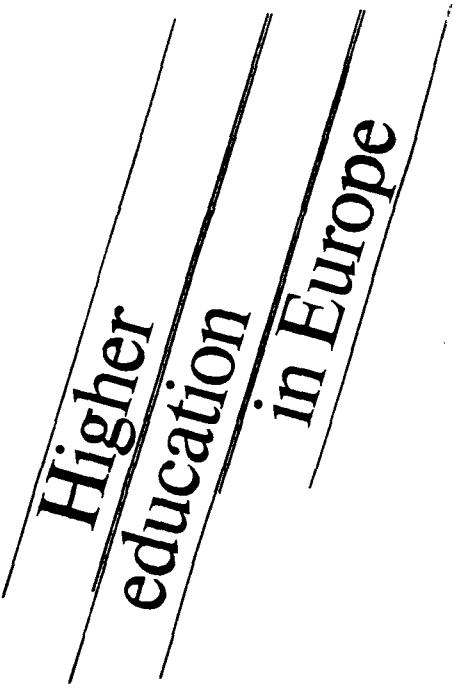
of Higher Education



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Higher Education in Europe

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FROM THE EDITORS

This double issue (winter and spring, 1988) of *Higher Education in Europe* contains the Proceedings of an international symposium on the "Relationship between General Education, Vocational Training, and Further Training in Higher Education", sponsored jointly by CEPES and by the Ministry of Public Education of the People's Republic of Bulgaria. The symposium, held in Sofia, Bulgaria, from 30 November to 2 December, 1987, assembled thirty-three participants, drawn from all over the Europe Region, including experienced academics and researchers, policy and decision makers on matters related to general and vocational education, and representatives of national authorities and institutions and of international nongovernmental organizations.

The crucial importance of the topic derives from a major development of our times. Increasingly, the economies of the postindustrial societies of Europe and of North America are being fuelled by access to and the application of knowledge derived from research undertaken in higher education institutions, in industry, and in other scientific organizations. Increasingly, members of the work force must be the recipients of high-level specialist training of a kind best provided by higher education. Yet the speed at which specific components of knowledge are becoming obsolete is more rapid, in some cases, than the time necessary for training a specialist, at least by means of traditional methods, and following traditional curricula. No wonder that the specific needs of industry are not always compatible with the "products" turned out by higher education institutions.

The task of the symposium was to explore various solutions to the problem of how to eliminate contradictions between higher education and employment through a proper alignment of its foci: diversification of higher education, on one hand, and a balanced mix, on the other, of general education, vocational training, and further training.

In order to disseminate the results of the symposium as widely as possible, the participants recommended that the Proceedings be published in the CEPES quarterly review. Moreover, by arrangement with the International Bureau of Education, the publication serves an added objective, namely as an information document for the 41st session of the International Conference on Education convened by the IBE in January, 1989, in Geneva. In order, indeed, to better anticipate this conference, the topic of which is "Post-Secondary Education and Its Diversification in Relation

to Employment", we have given the title, "Diversification of Higher Education", to these Proceedings.

The papers are presented in three sets: a first set, including an abridged version of the final report of the symposium, which provides an overview of the topic, and then two sets which correspond to its two working groups, one devoted to the diversification of higher education, and the other devoted to ways of achieving an optimal balance between general education, vocational training, and further training in higher education.

The 'Tribune' section includes three articles: an account, by Paul Kellermann and Gunhild Sagmeister of Austria, of a research project undertaken in their country on student motivations for undertaking university studies; a rather polemical analysis, by G. Patrick O'Neill of Canada, on the value of doctoral degree programmes in education in North America, with suggestions for their improvement; and an article, by Sylvia Brychová of Czechoslovakia, on the practices which have been adopted in the Slovak Socialist Republic to identify exceptionally talented and gifted university students and to create special instructional and research programmes for them.

The 'Information' section includes reports on three meetings. Of the two involving CEPES, one was a meeting of European journals of higher education, held in Viterbo, Italy, from 11 to 14 November, 1987, and the other, the CEPES Liaison Officers' Meeting, held in Pécs, Hungary, from 14 to 17 December, 1987. The third report is based on the final document of the international symposium on "Improving Co-operation between European and African Universities in the Fields of Teaching, Research and Inter-University Co-operation Procedures", held at the Interuniversity Center of Dubrovnik, Yugoslavia, from 21 to 26 September, 1987.

Diversification of Higher Education

Proceedings
of the
International Symposium on

"THE RELATIONSHIP BETWEEN GENERAL EDUCATION, VOCATIONAL TRAINING AND FURTHER TRAINING IN HIGHER EDUCATION"

organized jointly
by CEPES and by the Ministry of Public Education of the People's Republic of Bulgaria

(Sofia, Bulgaria, 30 November – 2 December, 1987)

I. An Overview of the Topic

INTERNATIONAL SYMPOSIUM ON THE RELATIONSHIP BETWEEN GENERAL EDUCATION, VOCATIONAL TRAINING, AND FURTHER TRAINING IN HIGHER EDUCATION *

(Sofia, Bulgaria, 30 November - 2 December, 1987)

INTRODUCTION

CEPES, in co-operation with the Bulgarian Ministry of Public Education, organized a symposium on "The Relationship between General Education, Vocational Training, and Further Training in Higher Education". It was attended by 33 participants including experienced academics, researchers, and policy and decision makers who met for three days, from 30 November to 2 December, 1987 at the Higher Institute for Architecture and Civil Engineering in Sofia, Bulgaria.

In initiating the organization of the symposium, CEPES began with the general assumption that the topic represented one of the major challenges facing higher education today. As the modes of study characteristic of higher education are becoming more and more diversified, a clear concern is emerging that certain types of higher education of a more markedly vocational nature should be developed. The question then arises as to what importance should be given, on one hand, to vocational training in higher education and, on the other, to the transmission and advancement of knowledge and to the pursuance of advanced research, tasks which have always been and shall continue to be basic functions of universities. Moreover, higher education institutions no longer confine themselves to the provision of initial training. They now devote an increasingly large proportion of their activities to the retraining and the further training of people engaged in professional activity. As a result, the role of higher education in training has acquired a new dimension.

PROCEEDINGS OF THE SYMPOSIUM

The contributions, read during the first-day plenary session, were the object of comments made by a number of participants who singled out some

* This is a slightly revised version prepared by CEPES on the basis of the Final Report of the symposium in question.

of the issues which, to their mind, needed further discussion at the symposium. Already at this stage it had become clear that the discussions were going to be centred around the rapid changes being experienced by the higher education systems in practically all the countries of the Region in their attempts to adapt themselves to new socio-economic conditions. In particular, much stress was given to the need to arrive at a clearer understanding of the diversification processes which are currently taking place in various higher education systems and of the combinations of factors which lead to such diversification. The question of the relationship between general and vocational education, as the very title of the symposium indicated, was to be approached on that basis, i.e. in terms of the consequences of the diversification of higher education for programmes, courses, and curricula, as well as for the broader functions of institutions of higher education.

The tasks, so divided, were to be carried out by two working groups which had been established by the end of the first plenary session:

— Working Group I was devoted to *Diversification of higher education with a view to better meeting the needs of society and of assuring employment*, and

— Working Group II was devoted to *Ways to achieve optimal balance between general education, vocational training, and further training in higher education.*

A. DIVERSIFICATION OF HIGHER EDUCATION

Working Group I was called upon to circumscribe its discussions to socio-economic needs and the corresponding policies and trends concerning the organizational structures and contents of higher education as well as the role of further training and retraining for highly qualified manpower in modern society. With regard specifically to *diversification processes*, the participants agreed that marked developments in the higher education systems of all the countries of the Region have occurred throughout the post-war period. While during the 1950's and the 1960's diversification was concerned primarily with increased delineations between the two principal streams of tertiary education: (1) academic institutions which provided programmes leading to academic degrees, and (2) institutions for higher professional and vocational training, diversification processes in recent years have gone beyond mere institutional structures. One important new element is the considerable diversification of the student population, as measured in terms of age, sex, previous educational background, and employment history. The other dimension of diversification concerns programmes and curricula as well as diplomas and degrees. A distinction should be made between *horizontal diversification*, which consists mainly in the creation of new types of institutions to serve specific purposes and a wide range of disciplines and programmes offered to students, and *vertical diversification*, which consists of cycles or sub-levels within a university programme, each leading to a certificate, a diploma, or a degree. The satisfactory completion of each level provides both for the possibility of entering active life and for the continuation of studies within the next stage of higher education.

In discussing the features, the causes, and the national experiences of the ongoing processes of adaptation of higher education to changing societal needs, the participants emphasized, in addition to diversification processes,

the existence of common factors which are exerting similar influences on different national systems of higher education. Among the determining factors which, according to the participants, seemed to be shared by the systems of higher education in the Region and to be exerting particularly strong influence on the generation of increased flexibility with regard to the organization and the management of higher education, the following five were cited: 1) *the accelerating rate of change in science and technology;* 2) *demographic trends in the countries of the Region;* 3) *the democratization of higher education;* 4) *economic changes in the Region;* 5) *higher education and employment.*

1. Accelerating Rate of Change in Science and Technology

All the participants considered that the rapid rate of change in science and technology and, in particular, the strong impact of the new information technologies on society at large and on education at all levels are primary factors influencing changes in and the adequate responses of higher education. In the opinion of certain speakers, the present period is a period of steady evolution from the phase of technical progress, through consecutive stages of research-induced technological revolution, towards quickly emerging patterns of *industrialized science.* Perhaps the following are the most characteristic features of the latter: (a) applied science itself has become the terminal product of industrial output; (b) as a consequence, the utilization of research is no longer governed by the sole impact of the "push" of "science provision", but, to an increasing extent, through the "pull" of "industrial absorption"; (c) as a result of the effects of growing economic interaction on the world market and the rapid dissemination of technological innovations, the implications of the "industrialization of science" are transmitted rapidly from the areas of their conception to the areas of their application, the latter frequently located at a great distance, in the geographical and developmental sense, from the former.

The repercussions of the process outlined above, operating as a high velocity developmental factor, are manifold and complex. They affect the ultimate configuration of production output and the traditional composition of growth inputs through the substitution of bodiless information for prime matter. This phenomenon triggers off subsequent changes in the volume and the skill-mix structures of the actively engaged workforces. The lifestyles and motivations of the individuals and of different social strata, especially with respect to consumer preferences, work behaviour, and career expectations, cannot, under the circumstances, remain unchanged. With each new phase in this advance, the process of the industrialization of science generates a need for educational response, one which can be of a more direct or of a more distant or delayed nature. The in-depth specialization of applied sciences calls for the setting-up of relevant academic disciplines and courses which are capable of serving newly emerging research needs as well as needs for the training of personnel. By the same token, the need arises for basic research to absorb and to critically evaluate the multiple inroads constantly being made by the applied sciences into other areas of knowledge, in order to reassess the validity and the congruity of the standing premises of fundamental knowledge.

The rapidity at which knowledge and skills become obsolete, either because of their substance or because of their narrow specialization, demands that higher education be able to provide various "packages" of recurrent and refreshment education, including programmes aimed at preventing "intellectual illiteracy" (obsolete basic knowledge). In order to remain fit, workers will need to undergo, far more frequently than in the past, an overhaul of the general and professional skills they had acquired when they began their careers. Such further training will probably be required more frequently and will be more essential for those holding high ranking intellectual and managerial positions.

2. Demographic Trends in the Countries of the Region

With regard to demographic trends, the discussants emphasized that most of the European countries are on their way to a *second demographic transition*, as evidenced by a combination of low birth rates and high life expectation rates. This trend is leading to a constantly rising proportion of senior citizens and, as a consequence, to numerical decline. One can visualize the implications of these demographic developments for the education process: education will be required to respond to the prospects of the ageing of the European populations. The adaptative modalities initiated so far, by sponsoring so-called "universities of the third age", are laudable but still far from adequate. If the extension of human life is not to deteriorate into protracted idleness and insecurity, more imaginative action is needed. Such action could act in the following fields:

— medical science and preventive health care, whereby the elderly, who have contracted family and social bonds, will be better able to look after themselves and to lead active lives;

— general education, whereby young people and adults are initiated, whenever necessary, to the ethics and the competences of social behaviour in a demographically changing society;

— professional and vocational education, whereby training programmes catering to the needs of elderly and disabled workers are envisaged;

— technological innovations, whereby the design of working tools, means of transportation, and housing would eventually offer a necessary measure of comfort to elderly people at work and during their leisure.

As European societies change their demographic, social, and ethnic composition, moving slowly away from the patterns which prevailed during the early industrial era, and approach the stratification characteristic of the information age, university education must be attuned to these changes. All the emerging clienteles of further education, however diverse in heritage, customs, and roles, should be offered a fair chance of contributing to and of benefitting from cultural development.

3. Democratization of Higher Education

The point was frequently made in the discussions that changes in the education sector are also prompted by the positive force of *democratization processes*. Democratization leads to a two-pronged evolution. As in the past, it aims, on the one hand, at a more egalitarian access to the material and the

cultural wealth of society. In recent times, on the other hand, it has been aspiring just as much to a more equitable participation in the management of developmental choices and of their subsequent implementation at the macro- and micro-levels. Although the particular sequences of determining factors, as well as the manifestations and the dynamics of this process may differ from country to country, they tend to be converging in all the parts of the Region, and to be creating similar requirements to which the education sector must react.

The participants shared the view that the principal characteristic of the present push for the democratization of higher education is composed of a number of components going far beyond the traditional demands for the opening-up of access to the terminal stages of formal schooling to forthcoming generations of potential students. These components include the following:

— more equitable sharing of education facilities among young people, working adults, and their elders;

— a closer link between democratization and provision, on a feasible scale, of educational opportunities that are adapted to individual talents, aspirations, and capabilities. Many "standard" curricular provisions might be found redundant and nonfunctional if measured against real needs as distinguished from routine and outdated perceptions of what the content of higher education and the mode of instruction should be;

— the imperative for education to intervene with increased vigour and to play an enhanced role in the preparation of individuals for active participatory democracy. The latter is bound to enrich work performance as well;

— educational extension, based on the spatial combination of the factors discussed above, i.e. the extention of educational opportunities towards outlying regions; an opening towards "hard core" student clienteles including "marginal" minority group members who are in need of target-oriented learning ventures. The expectation is that such ventures will contribute to the solution of the specific problems of targeted communities which are faced with serious economic needs, with ecological risks, and with cultural inferiority or depopulation. Needless to say, such "educational extension" ventures could operate as low-cost short-cycle, fixed-term programmes in which the high quality and motivation of teachers, employed on a voluntary basis, would play an important role.

4. Economic Mutations in the Region

The discussions brought to the fore the importance of the *economic environment* in which higher education institutions have been functioning of late. For a number of years, in many European countries, the rate of economic growth has decelerated, and the utilization of capital and labour resources has declined. The ensuing changes in the allocation of funds have selectively hit the spheres of social services by stimulating strategies of temperate public spending and the widescale recourse to commercial protectionism.

The compelling reasons for the reorientation of economic policies and the modalities of their implementation differ from one country to another, both in substance and in form. In some countries they are aimed chiefly at combating recession, in others, at improving production efficiency. What they have in common, however, is a drive towards rendering the education sector more directly accountable with regard to its practical contributions to overall devel-

opment, more particularly, to economic recovery. With the curtailment of liberal budgetary provisions and the shift from "secure" welfare policies to policies and practices intended to induce self-reliance, the institutions of post-compulsory education have found themselves forced to operate on a more economically determined basis and in closer touch with the preferences of their immediate customers with regard to teaching, training, and research. It is precisely in this area of the convergence of complementarity between the university and industry that most of the fresh initiatives for interaction are presently taking place.

Numerous examples and practical applications with regard to university--industry relations were described in the written contributions presented at the symposium. A few typical emerging patterns of university-industry relations, based on the discussions which took place in Working Group I, are set forth below:

— while university programmes and curricula are being continuously adapted to new needs, the participants agreed that frequent and comprehensive adaptations cannot keep pace with the rapid developments of technological advance, (neither should they aim at doing so). The proper policy should be one of putting increased emphasis on helping prospective graduates become self-reliant, adaptative, and open-minded rather than passively-oriented holders of particular skills;

— as given skills are best tested, modified, and improved through practical application, alternate or "cooperative" education ventures are gaining in popularity. These combine on-campus education with off-campus practical experience offered in training workshops, operated jointly by universities and by industrial concerns;

— research projects are being contracted out, supervised, and implemented through the mediation of consultancy firms, advisory bodies, and inter-institutional management boards, operated on a commercial or on a non--profit basis.

With the increasing recognition of the productive role of research and as a consequence of experience gained through the launching and the operation of such cooperative schemes, industry is tending to play an expanding role in the funding of universities. These funds are needed to finance new projects, and in many instances, to complement reduced state funding for higher education. Consequently, one frequently encounters instances of higher education institutions which compete for the financial support of these new sponsors.

5. Higher Education and Employment

The participants devoted much attention to the new patterns of *insertion of university graduates into the world of work* and *the utilization of highly skilled manpower* in the countries of the Region. A comprehensive discussion ensued on the complex issue of *graduate unemployment.* Agreement was reached that this matter is of utmost concern for academic communities everywhere. A wide diversity of views were expressed with regard to the perception of the causes of unemployment, the forms of its manifestations, and the remedies proposed in order to deal with it.

Referring to conditions in various market economy countries, one of the discussants suggested that, as a consequence of rapid technological change and of slow economic recovery, a number of university graduates run the risk of

remaining professionally idle for the rest of their adult lives. In fact, the working population at large might be divided into income-earners and income-sharers, with the latter category, even if not economically destitute, being underprivileged or poor. These being the risks, adequate counteractions, he argued, must be taken so as to make sure that some social control over the directions in which science and technology evolve is maintained and that the criteria of social justice and of human dignity are given precedence over the insatiate drive towards further labour-saving technological innovations and the big business profit orientations which fuel it.

Adopting a somewhat less alarming attitude, another participant argued that there are three manifestations of inadequate employment in the industrialized market-economy countries of the Region, namely: *open* unemployment, *visible* underemployment in the form of part-time jobs and reduced working time, and *disguised* employment. The last mentioned exists whenever the least socially secure minorities hold undeclared jobs, or when unemployment benefit holders refrain from declaring occasional jobs in order to remain on the "dole". He concluded that imaginative strategies for controlling economic development and technology transfer policies are necessary in order to reduce, if not to eliminate, these forms of "misemployment".

According to other views, certain manifestations of global unemployment which are considered as interacting directly with tertiary education are, in fact, limited as to scope and duration and belong to the category of "frictional" or "search unemployment", i.e. the period spent by a new university graduate in searching for his first job. Thus search unemployment was perceived as the effect of excessive job fragmentation on labour markets (primary cause), magnified by acquiescent educational policies whereby graduates are provided with nonmatching skill profiles (secondary cause). The uncontrolled and excessive diversification of educational programmes were perceived, in this context, as being counterproductive as means for improving the employability of graduates. Regardless of how they reasoned, the participants seemed to share the view that intellectual unemployment is primarily the result of a malfunctioning of the labour market. The response from education systems should therefore avoid simulating the deformities of "immediate employment demand" and address itself instead to the more far-sighted task of counteracting the causes of the malfunctioning of employment policies.

In a similar manner, the group discussed the manifestations, the causes of and the remedies for the invisible underemployment of highly skilled manpower in the centrally planned economies. The outward indications of possible mismatches between educational flows and employment vacancies came to the fore relatively late in some of the European socialist countries. At first they were considered to be a consequence of the gradual abrogation of the early intensive industrialization strategies that had been characterized by heavy investment and by the expansion of employment at a time when postcompulsory education was continuing to expand. Frequent variations in the economic dynamics (employment generation) and in demographic pressure (size of youth cohorts of university age) operated in turn as magnifying or as contracting agents of the mismatch. The educational aspirations of youth (regular education) and of adults (extra-mural education), which had been strongly stimulated at earlier stages, assumed, with time, the role of an autonomous generator of new student clienteles.

The planning of higher education so as to correspond to long-term manpower needs became increasingly difficult. Education at all levels being state-subsidized, the industrial cost of training fresh workforces, including highly qualified manpower, was very low, irrespective of the performance of individual enterprises and firms. As a result, the demands for skilled manpower communicated to planning authorities were sometimes inaccurate or deliberately inflated. Consequently, the educational push towards the employment sector was constantly reinforced leading to cases of underutilization of skill availabilities. Rather than finding fault with the educational system, it was argued that explanations for such a situation were more likely to be found in the flaws in the mechanisms of economic growth and in the absence of stimuli for skill absorption and for the constant upgrading of skills for promotion. Full employment being almost guaranteed, rational job placement, work efficiency, motivation, and satisfaction lagged behind.

Concrete symptoms of graduate underemployment differ from one profession to another and, of course, from one country to another. Many of the participants pointed out that far-reaching economic reforms aimed at assuring increased industrial efficiency, and coupled with complementarity changes in the policies of public service provision, have been adopted with a view to bringing about symmetry in the relationship between higher education and employment in the socialist countries. The crux of the problem lies in being able to create favourable conditions for qualified and imaginative work performance which will produce immediately visible and economically profitable results. The effects of successful ventures in work organization, including increased productivity and remuneration, should be increasingly reinforced within the larger communities, so as to gradually pervade entire employment sectors. At that point, the skill and the technology absorption "pull factors" would then come together on a more equal footing with the employment potential in education and science. While the problem of the adjustment of the two would not completely evaporate, and some adequate forms of control would still be exercised at the national and the regional levels, the hope is that they would operate in a healthy environment of economic and social trade-offs.

At the present moment, the processes of economic reform which are largely in their early stages of introduction are only affecting the top and middle levels of economic management. Thus the links between higher education and employment are, of necessity, governed by solutions of an interim nature. Various instruments of relevant action are being explored within the tripartite system consisting of the university, of industry, and of state co-operation. With the instruments of state regulation shifting towards industrial enterprise and increased university autonomy, the university-industry partnership is seeking feasible modes of contact with regard to the funding of research, and the training of personnel through direct co-operation at regional and institutional levels. While it is as yet too early to judge which of these solutions will stand the test of time, they all tend to make use of the diversification of the higher education "output" provision in one form or another.

At a more general level, the participants listened with sympathy to the opinion of one of the discussants according to which one of the results of the forthcoming technological change characterizing the postindustrial era will be a demand for the comprehensive redefinition of the presently dominant

concept of gainful employment. The resulting redefinition should recognize, in terms of economic and social status and benefits, the value of all socially acceptable roles and occupations, whether remunerative or not, whether contracted or voluntary, and whether performed in the workshop or at home. Such a move would help to enrich and support a more open approach to the instrumentality of education as assisting individuals in finding their own places for creative contributions to the lives of their communities. The cumulative effects of the insistance, over the last decade, that education be concerned primarily with training for productive job performance, has relaxed the grip of the "economics of scarcity" and now permits the university to pursue goals that are somewhat more ambitious.

B. WAYS TO ACHIEVE OPTIMAL BALANCE BETWEEN GENERAL EDUCATION, VOCATIONAL TRAINING, AND FURTHER TRAINING IN HIGHER EDUCATION

Focussing on the consequences for the *contents of programmes and for university curricula* of the processes of diversification of higher education, the participants centred their discussions around two principal issues: (1) the nature of the relationship between general education and vocational training in higher education, including the modalities for establishing an optimum balance between the two, and (2) the new roles and functions of higher education required for the further training of highly skilled personnel in present-day societies.

1. General Education and Vocational Training

The discussions began with an examination of various suggested ways of differentiating between general education and vocational training in higher education in an effort to arrive at acceptable definitions of both concepts. The point was made that not only does each concept have its own history but that different shades in their meanings can be identified transnationally as well. The distinction between general education and vocational education appeared in the course of educational history when, parallel to basic instruction, specialized vocational schools began to develop outside the actual work place. At the same time, a need was felt to look for ways by which the two kinds of education might be harmonized so as to eliminate the negative consequences derived from unilaterally emphasizing one or the other. The problem that has been constantly encountered in this attempt has been that of delimiting their respective areas.

The participants identified the following defining elements and characteristics of *general education:*

a. General education comprises teaching and learning relative to how individuals as well as institutions can solve current problems and deal with current situations. It also varies over time — in fact — it is contantly changing. What was part of a vocational programme ten years ago is considered to be part of general education today.

The discussants, however, agreed that among the perennial attributes and components of general education, the following two are of primary importance: (i) the fostering of the development of individual personalities by teaching students how to cope adequately with their social, political, economic, and cultural environments; and (ii) the development in students of the ability

to communicate effectively and to co-operate. The differences between general education, as found at the lower levels of education, and the general education components of higher education can be found in the fact that all students in higher education must be able to deal effectively with the results of pure and applied research. They must also be able to make contributions to the advancement of science and technology. This ability implies the application of an interdisciplinary or multidisciplinary approach which will make them aware of the possible undesired effects of new advances in research.

b. General education is also a body of knowledge, skills, and attitudes that can be applied to different vocational areas. The difficulty in defining general education in this context arises from the fact that a galaxy of knowledge and of skills appear to be necessary in order to identify its essential components. General education refers to the *basics* of the cultural heritage of mankind. Traditionally it comprised the knowledge provided by the arts and the humanities. Later, and primarily as a consequence of the rapid development of science and technology, it attempted to include all the basic knowledge which was perceived as contributing to the shaping of a multifaceted personality and to understanding one's total environment. Vocational training, on the other hand, was intended to be so specialized as to lead the student to an in-depth analysis of the knowledge and the problems linked to a particular occupation or profession. Education in breadth is meant to be *general* thus, as one might say, leading the student to know *less* about *more;* whereas, education in depth is primarily of a vocational or of a professional type which leads one to know *more* about *less.*

As has already been stated, the definition of general education is dependent on considerations of place, time, and scale. Accordingly, even if principles of general applicability emerge, the ultimate decision with regard to the content of the educational process must be established individually, by each institution, each school, and each department within the limits of each country's national consensus relative to education.

With regard to *vocational training*, the participants focussed their discussions on the following issues: (a) curriculum development as a means for identifying the components that make a trainee into a successful professional; (b) the adaptability of vocational training to the changes occurring in the fields in which students will be working, particularly the technical sciences in which rapid changes require that curricula be regularly revised.

Almost all literature on the subject, however, points to the necessity of establishing a close link between the contents both of general education and of vocational training in order to discern, to analyze, and to implement the educational and training tasks required in the exercise of a profession. As one participant forcefully pointed out, "the most important thing is not the distinction between general education and vocational training, but the distinction between an *ex-cathedra*, verbal type of education, lacking all application, and a type of training which, starting from facts and practices, leads to notions and to scientific concepts, through observation, comparison, and analysis, without ever losing contact in the process with the rich and changing reality". Consequently and according to this view, the distinction between general and vocational education has become meaningless, since all general education prepares one for vocationally oriented specialization and all vocational training is, to an increasing degree, part of general education.

Nevertheless, these two existing views, one which emphasizes the distinction between general education and vocational training, and the other, which rejects the distinction as being meaningless in the world of today, lead paradoxically to common concerns for the design of the contents of higher education. Both views stress the need to provide curricula which:

— contribute to the full and complete development of the personalities of students;

— present information and concepts in such a manner as to induce the making of associations, generalizations, and syntheses and the transfer of knowledge;

— establish relationships between present and future realities by developing in students the ability to formulate and to solve problems;

— prepare the individual to accept his need for permanent learning and for further training and retraining.

The above-made considerations lead to the self-evident conclusion that no universally accepted solution for the establishment of an optimum balance between general education and vocational training exists. Ways by which general education and vocational training can be harmonized vary from one educational system to another. It suffices to mention, for instance, that the design of higher education curricula is linked to and even dependent on the knowledge and the skills acquired by students while in secondary education. Systems of secondary education, however, display a great deal of diversity in the countries of the Region.

The participants attempted in the group discussions to identify some of the dimensions of the process by which a balance can be established between general education and vocational training:

a) *Balance with regard to the aims of education.* Such a balance is achieved by gearing education towards the development of personality and understanding, the search for one's place in the world, and the ability to take part in social, political, cultural, and economic life.

b) *Balance in the contents of curricula.* This dimension refers primarily to the optimum balance to be established between the humanities and the basic sciences in the curriculum, on the one hand, and the demands of vocational fields, on the other. It is also necessary to establish an adequate "division of labour" between initial education and further education: training based on a broad education in the basic sciences aims at imparting a great deal of flexibility to graduates; while further training which has in mind the specific needs of various occupations and professions must be based on the very latest results of research.

Based on the group discussion which also took into account the national experiences presented in the written contributions to the symposium, the participants tried to identify typical *models* for obtaining a good balance between general education and vocational training in higher education. Three such models were discussed:

Model A: according to which, general education in the context of higher education is to be interpreted as that amount of basic knowledge which is assumed to lay the foundation for the further training required for the specific needs of various professions. But the corpus of basic knowledge cannot be defined once and for all; it must be constantly redefined in order for it

to remain abreast of new theories and new advances in the basic sciences and in the accepted bodies of research.

Model B: according to which, the balance between general education and vocational training requires the development of a metatheory embracing a broader field of science (i.e. an integrative theory at a mid-range level). An example could be offered by a theory which would try to integrate all branches in the engineering sciences within the framework of a general theory of engineering.

Model C: according to which, the teaching of science is itself a specific form of general education. Since science attempts to understand and to offer explanations of the world, it acquires a generative, formative value. In an attempt to explain this model, one participant made a plea for what he called "conductive" education (instruction) which, unlike "deductive" education, does not establish a strict sequence between general education (during the first 2-3 years of a university programme), followed by specialized and vocational training (during the 4th or 5th year). "Conductive" education purports to combine general and special education, theoretical knowledge with practical skills, and the abstract with the concrete, from the beginning to the end of a given higher education programme.

c) *Balance with regard to the methods of instruction.* The discussion then shifted to the necessary balances to be established between the methods of instruction used in imparting basic knowledge and the methods for assuring the acquisition of professional skills. Such an instructional balance should include the following:

— the teaching of cognitive items versus the teaching of skills;
— classroom training versus on-the-job training;
— methods for developing the ability to do research.

The participants regarded the various problems raised in their discussions as a possible checklist of requirements which could be used in the implementation of various measures meant to solve problems related to the balance between general education and vocational training. The same checklist could also be used to evaluate current curricula. This latter aspect was considered to be very important because educational policy consists, for the most part, in the revision of the existing curricula and educational structures.

2. New Roles and Functions of Higher Education for Further Training and Retraining

General agreement exists that higher education today has assumed important functions by offering opportunities for *further training* to a broad spectrum of highly qualified personnel. An expanded system of further training is in fact a very important prerequisite for the opportunities and the risks associated with new advances in the technological, social, and cultural fields. Further training also offers welcome feedback to the universities. Through it, they learn whether or not scientific concepts have been successfully translated into practice and whether or not difficulties have arisen in their application. The assimilation of these new further training functions by the universities, one participant argued, requires a certain amount of diversity in terms of the *types of training* pursued on the one hand, and the *types of university* or higher education institutions involved on the other hand. He proceeded to expound on a typology of further training which he had pro-

posed in his written contribution. This typology, which includes *subject related, profession oriented, complementary specialist-training oriented,* and *problem--solving oriented* varieties of further training, could possibly serve to mediate between the needs of the world of work and the possibilities and the specificities of universities. Although these various types of further training were not discussed in detail, the discussants agreed that since they seemed to provide answers to some of the problems raised in the debates, they should be clarified by further investigation. At this point, one of the participants made the remark that further education programmes at the university level offer a quasi-natural balance between general education and vocational training.

The *institutional balance* between general education and vocational training with regard to programmes of further education was also discussed. The classical university has obvious drawbacks in this respect, particularly as a result of the separation of teaching from research. Some efforts have been made to eliminate these drawbacks. One of the participants evoked the so--called *cooperative university* as a possible model for a university or a department which might wish to evolve beyond the classical model. Such a unit would offer support, through its staff and its technical infrastructure, to all those wishing to take up scientific work in all spheres of teaching and research: social, economic, cultural, as well as technological, artistic, and literary. The two most important characteristics of "cooperative" universities would be flexible relationships between teachers and students and between senior and junior researchers.

The participants regarded the increasing involvement of higher education institutions in *adult education* programmes as being directly relevant to the topics discussed in the symposium. For in fact, universities are gradually becoming centres of adult education. In a sense, this transition is occurring by virtue of the fact that the age of university students is constantly increasing, many of them taking up university studies after periods of varying length that they have spent in active life. This increase in the numbers of "non traditional" students will certainly require universities to diversify their programmes in order to satisfy a wider range of individual needs. On the other hand, further education programmes, which have almost everywhere experienced constant expansion and diversification, have aspects which link them to adult education. They are thus included in programmes devoted to it. There is growing awareness of the fact that adult learning requires special *contexts* (either special institutes or specialized departments attached to higher education institutions). Moreover, they require special *contents and curricula* which pay due attention to the balance between general education and vocational training. They also require that the choice of programme contents, as well as of instructional methods, be based upon adequate research on the specificity of the adult learner.

CONCLUSIONS AND RECOMMENDATIONS

A. ISSUES OF GENERAL CONCERN

The rapid evolution of the economic, social, and technological environments in which university education is operating at present is an established

reality; so is the need to make changes in the connections between them. Some points of caution should, however, be mentioned in this respect:

— First, this need should be conceived as reciprocal and not simply one of adaptiveness on the part of the education system alone.

— Second, flexibility and diversification, however welcome and timely, should in no way lead to the lowering of the standards of excellence of the university. One specifically has to be aware of the dangers inherent in the excessive *fragmentation* of the provision of professional training through the profusion of cheap, substandard courses which claim that they meet the "immediate needs" of career orientation. Proper warning should also be given relative to the possible danger that higher education may be subjected to undue pressure by business executives in the process of searching for funding support from industry.

— Third, a lack of action on the part of higher education could lead to the opposite danger. If the necessary initiatives are not forthcoming from the academic community, unmet demands for professional training run the risk of being met and eventually of being saturated by spontaneous ventures of the "shadow education" sector.

There is no justification for diminishing the inherent role played by the university in the transmission of the cultural heritage from one generation to the next. Also, the perennial issue of reconciling the mission of the university to pursue excellence with newly emerging tasks and goals (professional training, the widening of accession routes, the furthering of technological advance) must find adequate solutions through a redefinition of the new terms of reference brought about by contemporary developments. While it might perhaps be illusory to aspire towards an ideal situation in which all higher education institutions assume positions of equal excellence in the respective fields of their specialization, two guidelines can be suggested in this respect:

— the natural and useful ranking of universities in terms of their status and standards with regard to fundamental research, or to the quality of teaching, or to both is neither ordained nor commissioned. It should come and stay (or go) on the sole strength of the competition between their staff-teams and should be open for continuous evaluation by the academic community;

— the more heterogeneous and diversified the combined ventures of tertiary education are, the stronger the responsibility of the centres of excellence for informal assistance and control over the academic performance of their affiliated colleges becomes.

With regard to the implications for *university autonomy* of the developments outlined at the symposium, the participants were of the opinion that we are witnessing a trend favouring the shortening of the distance between the two extreme positions with regard to university management: that of complete autonomy versus that of comprehensive accountability towards the State. There seems to be little sense in pursuing autonomous policies for university development while remaining ignorant of development priorities at the national or the macro-regional levels. At the same time, it may be appropriate to leave to the universities the autonomous right and obligation to define their contributory roles in the pursuit of national development priorities. A general consensus exists that the search for adequate answers and solutions to the problems facing higher education today must be made with

proper concern for university autonomy as the main prerequisite for the preservation of academic excellence.

The participants expressed a number of views with regard to what society is expecting and will increasingly expect from university graduates. Among the views in question, the participants retained the following as enlisting general consensus:

1. University graduates will be expected to be equipped with high quality *initial* training, but more importantly so, to be ready to *learn permanently.* Initial training must be solid but general in approach because, if it is too narrow, however advanced it may be, it will soon become outdated.

2. Rather than applying already acquired knowledge, graduates will be requested to *apply creatively newly emerging knowledge* and to be able to *foresee* developments and to do *research.* This requirement will become a *sine qua non* for future university-trained personnel employed in all walks of life.

3. Graduates will be expected to *communicate,* to *co-operate,* to *work in teams,* and increasingly, to do all three in an *international context,* for the world in which we are living will become ever more interdependent.

The essential goals of future-oriented university education should accordingly concern:

— the dissemination of communication skills and the provision of multidimensional literacy;

— the instilling of capacities for logical and critical thinking;

— the teaching of personal skills of highest significance for interaction among people;

— assistance to students in comprehending the realities of the functioning of society, of the mechanisms of decision-making processes, and of the rights and obligations of adults within their communities;

— the interpretation of the implications of the value system for the personal and professional conduct of persons confronted with dilemmas created by the inroads of science and technology into the sphere of human life.

The central issue of the above-stated goals is that of their "combined" transfer regardless of the professional or of the faculty specialization of the given academic teacher.

In the context of the discussions concerning the implications of diversification for the contents of programmes in higher education, the major emphasis was laid on *interdisciplinarity.* A principal objective of university curricula should be to impart a sense of globality in order to sharpen understanding of the inner workings of human systems and of their relationships with the natural and the technological systems. A holistic approach — distinct from the prevailing fragmentary one — is indispensable. The world (or the community) has *problems* while the university has *departments;* and as long as this reality remains unchanged, education cannot fulfill its mission successfully.

The last point, one of no less significance, which arose from the discussions, concerned the *international dimension* of university development programmes. The initial feeling was that while substantial advances had been made with regard to the promotion of cooperative research and of action relative to higher education management at a subregional level (cf. programmes launched by OECD, EEC, the Council of Europe, and the Council for

Mutual Economic Assistance of the socialist countries), much remains to be done in this respect at the level of the Europe Region as a whole. The participants also voiced a request that the various centres of excellence in science and learning should find appropriate instruments for participation in actions aimed at reducing the research-technology gap between the European and the less economically advanced countries of the world.

B. RECOMMENDATIONS FOR UNESCO AND ITS EUROPEAN CENTRE FOR HIGHER EDUCATION (CEPES)

The participants in the symposium made the following suggestions and recommendations for Unesco and for its European Centre for Higher Education (CEPES) with a view to assuring follow-up activities:

1. Underlining the importance of the collection of information on the diversification of higher education systems and of national experiences in bringing higher education closer to the needs of society, the participants encouraged CEPES to continue to systematically collect such information, preferably in co-operation with other units of Unesco as well as with international governmental and nongovernmental organizations active in the field of higher education. On the basis of such information, CEPES could prepare *comparative studies*, at the European level, of the various issues involved. They pointed out, for instance, that information related to the organization of studies and the diversification of terminal and intermediate degrees and certificates is in short supply at the moment as most existing overviews of higher education tend to focus on regular degree courses or on graduate programmes. There is little information available on part-time students in higher education, on short-term courses, and on the development of multiple stages within a programme, with each stage having both terminal and "further access" functions.

2. The relationship between higher education and employment, especially the issue of graduate employment, emerged as the most debated theme of the symposium, capturing the attention of all participants. The point was made that it is a cause of concern in practically all the countries of the Europe Region. Given the great variety of views with regard to the causes, the manifestations, and the proposed solutions to this question, a recommendation was made that CEPES undertake a *comprehensive study of higher education and employment in the countries of the Europe Region.* Such a study could be regarded as a follow-up and sequel to the similar study entitled *Higher Education and Manpower Planning: A Comparative Study of Planned and Market Economics*, which CEPES produced in co-operation with ILO, at the beginning of the 1980's.

3. In the opinion of many participants, lifelong education, organized in a variety of forms and catering to a broad range of audiences, has emerged as a major function of higher education. Therefore, the participants noted with interest the intention of CEPES to organize an *international symposium on "Universities as Centres of Lifelong Education"*. They were of the opinion that such a meeting would provide an opportunity to analyse in some detail, current developments related to this growing function of higher education, particularly issues which could not be explored in depth at the Sofia symposium.

4. The participants welcomed the proposal of their colleague from the German Democratic Republic concerning the organization, by CEPES, of a regional meeting of experts aimed at discussing *newly emerging patterns in the relationship between higher education and industry.* Since past analyses of university-industry relationships have tended to concentrate primarily on research and training links, the participants were of the opinion that the proposed meeting, while not neglecting this important dimension of the relationship, should also adequately cover questions related to the teaching and the training of highly skilled manpower, more particularly the various modalities adopted in the countries of the Region for cooperative education and for enhancing the role of higher education in the provision of in-service training for highly skilled industry personnel, including industry managers and other categories of employees.

5. Innovative ideas related to the diversification and the flexibility of curricula require adequate changes in the attitudes of university teachers. The point was accordingly made that ongoing and newly envisaged *staff development programmes in higher education* should be prepared to tackle this issue. One mechanism for doing so could be the European Network for Staff Development, initiated by Unesco, in the functioning of which CEPES is called upon to play an important role. To this purpose, CEPES was requested to suggest relevant topics for discussion at the next regional workshop of the Network, to be held in 1989.

PROBLEMS CONCERNING THE LINKAGE BETWEEN GENERAL AND VOCATIONAL EDUCATION AND HIGHER EDUCATION

Ivan A. MASLAROV

Introductory Remarks

We are now on the threshold of the 21st century. The revolution in science and technology having gained a vast momentum, new technologies have radically altered the production of goods. Socio-economic development in the countries of Europe has been characterized by an incredible growth in the role of the human factor. As higher education contains the largest institutional concentration of intellectual potential, it will multiply its functions as a catalyst of progress. At the same time, the growing avalanche of information and the accelerated obsolescence of knowledge will continue to create an ever more tangible need for the radical and comprehensive reform of educational structures. The relatively autonomous systems of secondary and higher education, including postgraduate studies, which took shape over the years, are gradually evolving into integral systems for the lifelong education and the intellectual and vocational development of the individual. Varying degrees of integration are already quite apparent in most of the European countries.

Were a given education system to be examined with a view to determining how far it had progressed towards total integration, the following aspects would need to be closely scrutinized:

— its *continuity*: Is movement from a lower to a higher educational level "smooth" and rapid so that students are held back as little as possible?

— its *adaptability and flexibility*: Is the given education system flexible, dynamic, and closely linked to the sphere of labour as required by the accelerating processes of specialization and division of labour, the increased generation of information, the emergence of a new inherent interest in the individual, the changes in social needs, and the educational goals which various governments are setting for themselves?

— its *long-term prospects and its awareness of future developments*: Is it aware of the trends expected to emerge ten, or at least some five years from now, given the long period needed for one to qualify for admission to higher education and to complete a first level of attainment? For an integrated system of education and intellectual and vocational development to accomplish all its tasks adequately, it should be capable of accurate prognostication, of foreseeing the coming trends in science, technology, and social needs, and of retailoring as needed the inherent goals and methods of education, curricula, and the inner and external mechanisms of interaction;

— its *ability to organize itself*: Is increased priority being given to educational processes despite the decline in the support being accorded to research and to personnel? The elevated intellectual level of an integrated education system presupposes a high level of independence with respect to its own functioning and development in harmony with the expanding requirements which must be met for competent management.

The Interface between Secondary and Higher Education within the Context of an Integrated Education System

In my opinion, the linking of general and vocational education to higher education and further training should be examined against the backdrop of an integrated system like the one evoked above. The problem of the transition from secondary to higher education has been the object of detailed research. Some of the resulting studies, articles, and monographs have yielded a number of useful conclusions, even if most of the work has been undertaken from a point of view which stresses either higher education or secondary education, each one ignoring the interests of the other. The general characteristic feature of secondary education in the majority of the countries making up the Europe Region of Unesco is summed up by its goal: to ensure the intellectual and the social development of young people and to lay the groundwork for their successful self-realization in life by the provision of relevant occupational training. Different forms of secondary education stress varying objectives, all of which are capped by this larger goal. Within one group of secondary schools, the problems of intellectual development are dominant. Such secondary schools rely on higher education to ensure to their graduates the means of their vocational self-realization. Thus they are oriented towards admission to and rapid adaptation within higher education institutions. Those secondary schools which are definitely oriented towards post-school occupations emphasize vocational training.

Most people will agree that the democratization of education requires the elimination of all existing formal restrictions on access to higher education. In other words, every secondary school graduate should be eligible for admission to higher education.

Three forms of secondary education have been established in Bulgaria:

1) the unified secondary polytechnic schools, which provide students with a broad but basic knowledge of the humanities and the natural sciences, with general culture, with an ideological and political outlook, and with certain industrial and technical skills. A graduate of such a school is capable of doing supervisory work in a broad number of specialities;

2) the secondary technical schools, in which training is oriented towards the acquisition of industrial capabilities, includes theoretical and practical aspects linked to the mastery of specific tehnologies and production techniques. In addition, students are given general educational training in which some of the basic elements of the natural sciences are imparted in the form of applied technical knowledge. Graduates will hold executive positions in their respective enterprises;

3) the technical schools, which provide students destined for managerial positions with broad general scientific knowledge combined with training in

the application of basic technologies as required for engaging in specific occupations.

The government of Bulgaria is able to guarantee employment to every graduate in accordance with the training he has received.

Regardless of the type of secondary school from which a person graduates, he is eligible to seek admission to a higher education institution. A large proportion of the young people of Bulgaria — over 70 per cent — are graduates of secondary schools. Moreover, the Constitution of Bulgaria guarantees to each citizen not only the right to a job but to one which conforms to his training. University enrollment is regulated by the state by means of a system of national entrance examinations.

Nevertheless, even the most refined system of competitive admission has certain shortcomings. The anonymity of the examination system, resulting from a quest for objectivity, causes the individuality of applicants to suffer. Although a number of persons have criticized the examination process, one which is based on the quantitative evaluation of knowledge, a number of technical limitations have prevented its modification in the direction of greater comprehensiveness so as to make it capable of identifying and of evaluating a wide gamut of personal assets. Nevertheless, experience indicates that given the conditions prevailing in Bulgaria, competition based on school-leaving grades is the most suitable criterion for determining admission to higher education establishments.

How successful a given student will be once admitted is largely determined by the training which he obtained in secondary school. Numerous studies of the overall results of entrance examinations indicate that those who pass and are admitted to the institutions in question are overwhelmingly students who have earned high marks in secondary school. Other findings indicate that the academic profiles of given class cohorts are largely determined by the quality of the training which their members had received in secondary school. The same kind of relationship can be further traced throughout the study periods of the same students. Those who pass the entrance examinations with high grades usually continue to earn good grades thus proving that they are particularly suitable for undergoing the moulding processes which will make them into fit specialists. Those whose admissions results were of lower quality tend to be less successful as university students and to go on to only modest careers.

The increasingly intellectual nature of human activity will require that a growing portion of each generation of young people earn higher education credentials. At the same time, higher education will increasingly require advanced prerequisites with respect to the ability of candidates to express themselves mathematically and/or textually. Thus increasingly heavy demands will be placed on secondary education.

Were one to analyze the changes in the curricula of the humanities and of the applied sciences as they are offered at some of the leading higher education institutions, one would discover that:

— higher education in the humanities is increasingly acquiring mathematical and technological aspects thanks to the advent of powerful new methods of modelling and of prognostication, largely the result of the introduction of modern computer and information technology;

— higher education in the natural and the applied sciences is becoming increasingly "humanistic", demonstrating a growing awareness of personal and social affairs, thanks to the ever increasing perception of the importance of the human factor.

The trend in question has resulted in a steady rise in the share of higher education specialities which require incoming students to have had adequate training in both the humanities and in mathematics. A major objective of secondary education should therefore be the discovery and the encouragement of the full panoply of capabilities in young people.

The realization of this objective, however, has given rise to contradictions among those of its components which are more or less emphasized by the different forms of secondary education. At first sight, vocational training seems to eat away at the amount of time available for general education which, as was already noted, should be multifaceted. But at the same time, vocational training does offer an opportunity to introduce the student to real-life practices, to involve him directly in socially useful work, and to mould within him a proper system of values.

Vocational training in secondary schools requires that the career orientation and the discovery of a child's interests begin as early as ages 14 to 16. At the same time, responsible educators realize that attempting to constrict a child's personality within a "tunnel" could prove to be very detrimental. As adolescents gain knowledge of their surrounding world, their interests, their likes, and their dislikes will fluctuate; thus, any restrictions affecting horizontal mobility, particularly in terms of the input of higher education, might give rise to acute conflicts. The existing legislation in Bulgaria, while applying no prohibitive restrictions, is based on the principles of orientation and of counselling. O course, it would be most worthwhile to be able to achieve continuity between the vocational training offered in secondary school and that offered as major subjects by higher education institutions. Efforts to achieve such continuity should be encouraged.

The available data, however, indicate that a significant number of university candidates pick a major subject which is different from the one they studied by means of vocational training programmes in secondary school. This statistic, however, should not give grounds for doubting the effectiveness of vocational training. On the contrary, by the time a student has graduated from secondary school, his vocational training has already served its educational and social purposes. In fact, in quite a few cases, it has stimulated university students to pursue various interdisciplinary interests.

What these examples all demonstrate is the need for continuity in the educational process from secondary to higher education. Secondary schooling is not only called upon to provide basic information required in order to gain access to specialized knowledge in a given branch of science; it is also called upon to teach students how to think scientifically and to arm them with working skills without which they will be unable to tackle the difficulties involved in being successful in higher education. The process of transition from secondary to higher education should guarantee that the newly enrolled students will begin their university studies "in top shape", without any interruption in learning, and without having lost the habits of intellectual activity acquired in secondary school.

Access to Higher Education

The social significance of the problem of broader access for working youth to higher education is well known. A number of countries have, in fact, established institutions of the open university type. The idea of granting access to universities to people who have not received formal secondary education is being duly considered in Bulgaria, even though the law requires that a university applicant have earned a secondary education diploma. Indeed, such a diploma can be awarded only after the student has passed all the subjects included in the curriculum. The possibility of an extra optional subject in the final stage of unified secondary education, like what is offered in the polytechnic schools, was introduced so as to involve graduating students more completely in the selection of their future careers. A further refinement of the system of competitive admission to higher education is currently being discussed with the aim of boosting the personal responsibility of students for the choices of their major subjects and of their optional groups of subjects in the respective higher education institutions.

A number of European secondary school systems permit high grades in one group of subjects to compensate for unsatisfactory grades in another group. The holders of diplomas earned under these conditions are restricted as to their choices of specialities when seeking admission to higher education institutions.

The past decade in Bulgaria has witnessed the emergence of procedures whereby access to higher education is offered to currently employed secondary school graduates. The only requirement is that potential enrollees have earned grades of a certain level in secondary school in those subjects which will form the backbone of their further studies at the higher education level. The institutions concerned organize eight-month refresher courses for such candidates to help them review and deepen their knowledge in general areas of secondary education which they will need. Each eight-month period of course work is capped by an examination. Those who pass the examinations are enrolled at the given higher education institutions. The experience gained so far indicates that so long as candidates are selected on the basis of definite interests, motivations, and intellectual abilities, the eight-month courses prove to be very suitable as additional avenues of transition from secondary to higher education for employed students.

As was already noted, the relationship between general and vocational training, on the one hand, and higher education, on the other, is not a one-way relationship. The current flows in two directions. In addition, an indirect relationship which acts through the sphere of social practice and the conditions of personal realization affect the requirements for the training of secondary school and university graduates. Finally, higher and secondary education are mutually influenced through projections of their expected future needs. As integrated systems of life-long education and systems providing for the intellectual and the vocational development of individuals grow more sophisticated in the art of prognostication, the relationship between general and vocational training will grow closer.

In many respects, higher education is called upon to pursue objectives similar to those facing general and vocational training. The indirect relationship between the two sub-systems via social practice is usually manifested in

the form of general social demand. Whether clearly formulated at the national level or merely reflecting an existing need for various types of personnel, social demand acts as a powerful overall regulator of the entire education system.

The Bulgarian Experience

The restructuring of Bulgarian secondary and higher education is attuned to the pursuit of qualitatively new types of development in the national economy which are being accompanied by profound changes in the intellectual sphere: in culture, in science, and in education. The envisaged high rates of growth of the national income and of labour productivity require qualitative changes in the material and technical base of the country in line with the latest achievements in science and in technology. Technological rearmament and the orientation of goods production towards au output which is less resource-intensive will require profound changes in the structure of the labour force. Such will be the dynamics of these processes over the long term that the number of people recycled from industry to education for retraining will come close to equalling that of students following conventional channels of secondary and higher education.

The country's educational system as a whole is being faced with the following new tasks:

— the achievement of a close linkage with practice;

— the acceleration of the processes whereby working people are provided with additional training;

— the radical improvement of the quality of training provided to secondary and tertiary level students;

— quantitative and qualitative growth in the output of ideas and products of fundamental and applied research sufficient not only to satisfy the specific needs of the education system itself but also to meet general national demand.

The complex nature of these and quite a few other tasks requires that they be tackled through a growing integration of science, education, culture, and production. Only in the setting provided by this kind of integration will education prove capable of training personnel of a new type who will correspond to the current levels of science and culture.

The growing role of intellectual labour requires that both secondary school leavers and university graduates have personalities reflecting civic motivation as well as the multifaceted development of the country. To that end, and as a result of the information boom, education is reorienting itself profoundly so as to better be able to master the approaches to and the heuristic means for learning and for practical activities. Special emphasis is being placed on training and on the instillation of proper mental configurations for innovation in social practice. In higher education, vocational training is turning to the study and the application of general principles for integral and standard production methods, to the imparting of a technologically-aware manner of thinking in the broader sense of the word, and to the corresponding integration of the structures of the content and the organization of education.

If education is to be successfully directed towards the fulfillment of future needs, constant prognostications as to the future development of technology in the areas of production, services, management, and education must be made available and be presented according to the yesterday-today-tomorrow model.

This procedure will lay the groundwork for a definition of the laws by which the various professions undergo essential changes and become integrated so as to guarantee "a present-day education aligned to a future career".

According to prevailing views in Bulgaria, the democratization of education cannot simply be reduced to the provision of equal opportunities for all people to obtain education and self-realization through work. The interests of the nation require that, in addition, individual be guaranteed conditions conducive to the full-fledged manifestation and evolution of his inherent talents. In this sense, the multifaceted development of the individual and his full-fledged realization in life have been formally proclaimed as the ultimate objective of the Bulgarian educational system.

What this objective amounts to is a guarantee of flexibility in education starting with the very first year of schooling. The flexibility envisaged will enable young people to become conscious of their own identities and to choose their paths in life. Should the need arise, the same flexibility will offer young people the opportunity to be reoriented towards more suitable forms of education. This procedure provides scope for the development of the talented and the gifted.

To fulfill the above-stated end, Bulgaria has an established system of secondary schools which admit those students, by means of competitive examinations, who are clearly gifted and who demonstrate superior levels of training. Among the schools making up this system are several secondary schools of music and the fine arts. Their graduates make up the bulk of the students who are afterwards admitted to the higher schools of music and the arts. A number of similar types of schools have curricula which emphasize the natural sciences. One secondary school emphasizes ancient languages and cultures.

To begin training personnel who will be fluent in foreign languages at the earliest practicable age, Bulgaria has created a network of unified secondary polytechnic schools in which parts of the curricula are taught in Russian or in a Western language. Statistics indicate that the graduates of these schools do much better than average on the university entrance examinations. This success rate is not the result of an elitist approach, however, but of early selection through competition and the early orientation of children with outstanding talents.

The process of diversification in higher education also affects secondary education through the involvement of certain higher education institutions in the teaching of secondary-level students. One new secondary technical school of microprocessor technology, in which a part of the curriculum is taught in English, already exists. The school is a division of the Higher Institute of Mechanical and Electrical Engineering of Sofia. Its general curriculum is the same as that of the unified secondary polytechnical schools; however, special technical subjects are taught by faculty members drawn from the institute. The opening of similar schools in other promising areas of technology is being considered.

The vocational training complexes which came into existence over the past several years provide yet another way in which higher, secondary, and vocational training are linked to social practice. These complexes were created through the elaboration of voluntary projects linking secondary schools and higher education institutions, on the one hand, and factories, businesses, research-and-development facilities, and the like, on the other. Their aim is to provide improved specialized training to secondary school and university stu-

dents and to retrain already employed personnel. The fact that the projects in question are joint projects ensures the most propitious conditions for the attainment of these objectives. Consequently, the research and teaching potential and the available material facilities are used with increased intensity. The informal relationships between education and practice which these complexes are creating will no doubt provide improved conditions for the practical specialization of secondary and university students, while facilitating the career orientations of the former.

Obviously, there are many problems, some of which are of major importance, involved in the linking of general and vocational education to higher education. A brief report cannot begin to formulate, let alone analyze, all of them. Our aim has simply been to review what has been done in this respect in Bulgaria and to suggest possibilities for the exchange of information.

GENERAL EDUCATION, VOCATIONAL TRAINING, AND FURTHER EDUCATION

Kjell HÄRNQVIST

The title of my paper is as broad as the theme of the symposium itself. However, I intend to concentrate on some aspects that demonstrate conflicts between different goals in the areas of general, vocational, and further education. This task will be accomplished against the background of Swedish higher education in which all three types of education are found within one integrated national system. Even though most of my examples come from experiences in Sweden, they can be found in many other countries as well and, therefore, have general interest.

Higher education can be defined in many different ways (cf. Barnett, 1985). For example, it can refer to that part of the educational system in which all study programmes are intended to transmit certain intellectual, cultural, and moral values in addition to specialized knowledge and skills. This statement represents a classic ideal of universities. Instead of such a qualitative definition, one can formulate an administrative one to the effect that higher education is synonymous to post-secondary education. In a system with mass higher education, it is difficult to come up with another definition, and I shall therefore start from it.

Swedish Higher Education after 1977

First I shall give a brief account of the higher education system from which I derive most of my examples and experiences: the Swedish system after the major reform of 1977. Basic or undergraduate education is divided into five sectors, both at the level of the national budget and at the local decision-making level. All sectors are defined from a vocational or professional point of view, and all lines within the sectors are expected to prepare for vocations or professions. The lines may differ in length from 1 year to 5.5 years.

In the technology and science sector, one finds the occupations of civil engineer, chemist, and biologist; in the administrative, economic, and social sector: public administrator, business economist, social case worker, and psychologist; in the medicine and nursing sector: physician, dentist, nurse, medical technician; in teaching: teachers for all levels from preschool to secondary school; and in the culture and information sector, for instance, the occupations of librarian, journalist, and also of painter, musician, and actor.

In addition to lines, the sectors also contain separate courses of varying length which can be used either for further education of a specialized kind or for more discipline-oriented studies within a field including preparation for research education. Selection for and admission to most lines is based on secondary school marks and work experience. An exception is the artistic fields for which work samples or auditions are required instead of the formal criteria. The lines lead to diplomas but not to academic degrees in the traditional sense.

The traditional academic disciplines are organized in faculties for research and for research education, as for instance, in the cases of medicine, the social sciences, and technology. From the beginning, their local decision-making organs were separated from those of the undergraduate level, but as of two years ago, decisions favouring the integration of sectorial and faculty organs can be made at the local level.

The general goals of the reforms at the undergraduate level, as formulated by the national government, are in principle identical for all education offered within the comprehensive system. They include general education beyond the secondary level along with vocational preparation in a specific field. Both are expected to be based on knowledge gained in scholarly research and approved practice and, in turn, both contribute to improving vocational practice. The admission of students and the processes of instruction are expected to be so arranged that existing differences in participation successively decrease between men and women, between age cohorts, between social strata, and between students from different geographical regions. This task is huge indeed. It therefore comes as no surprise that conflicts may arise between different aspects of the general goals.

Theory-Practice Relations

Some of the problems become more visible if we look at what has happened since the reform of educational programmes, given, on one hand, professions that have traditionally been part of the university system and, on the other hand, vocations that were brought into the universities as a result of the comprehensive reform. One such pair is to be found in the medical field: the contrast between the training of physicians and of nurses.

The training of physicians was not in any large degree influenced by the reform except in one respect: the rules for selection among the abundant number of applicants. The new selection rules that were part of the reform gave considerable weight to the length of work experience of the applicants. Thus the age distribution of admitted candidates was moved upwards. The result was that not only would some of the new physicians have a rather short time in which to practice after completing their training but that the older candidates were regarded as having a reduced retention of their secondary school preparation in sciences and perhaps also a reduced motivation for mastering their first years of basic science courses. This situation made teaching more complicated than in the past. The result, in short order, was a change in the selection rules favouring students coming directly from upper secondary school. One wonders whether or not the official reaction to the unexpected and the unwanted side effects of the selection rules would have come so rapidly if the

profession involved had not been one that was strong and established, with a large surplus of qualified applicants, and a strong pressure group of influential parents.

Nurse education on the other hand "came in from the cold", was placed in communal colleges for para-medical education, and was expected to change radically in order to improve its academic reputation. The situation was further complicated by the fact that its entry into higher education coincided with a desired change in the vocational role of nurses, from that in which nurses were technical helpers of doctors to a more independent and holistic approach to nursing and care, based not only on biological but also on behavioral science and its components. New possibilities for research education were opened up for trained nurses, and attempts were made to build up nursing care as an independent discipline (cf. Wallén, 1984).

The implementation of the new training programme for nurses was studied by Berit Askling (1987). The adoption of the new guidelines for their education, and the reaction to them among teachers and students, varied markedly among different colleges. On the whole, however, the reception was rather skeptical relative to the softer parts of the curriculum as presented in introductory courses and followed up in problem-oriented group work. Nursing care as a discipline had not gained enough strength to compete with the traditional medical disciplines included in the programmes. In addition, there seemed to be a discrepancy between the preparation required for the new role and the demands of the profession as observed in current practice.

At least two problems are involved here: the relationship between theory and practice and the adjustment to current occupational demands versus the training intended to serve as an agent of change. The standard model for the theory/ practice relationship was illustrated by Askling as in Figure 1 .Academic disciplines deliver the curricula of the courses in theory which are usually the first to be offered in a given programme.

Professional practice determines the content of practical courses. Theory and practice are expected to influence one another in harmonious ways. But

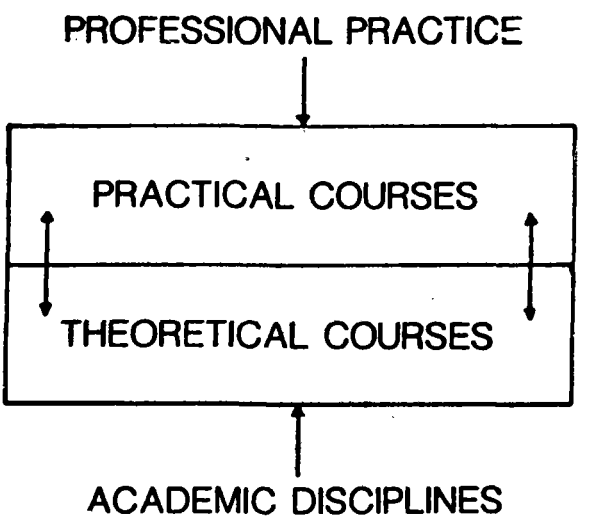

Figure 1 Theory/practice relations in a static situation (from Askling, 1987)

in fact the integration of the two sides becomes difficult because theory is organized in specialized disciplines, while practice is problem-oriented.

When it comes to the adjustment vs. change relationship, integration becomes even more problematic as shown in Figure 2. Practical courses are still primarily influenced by current professional practice.

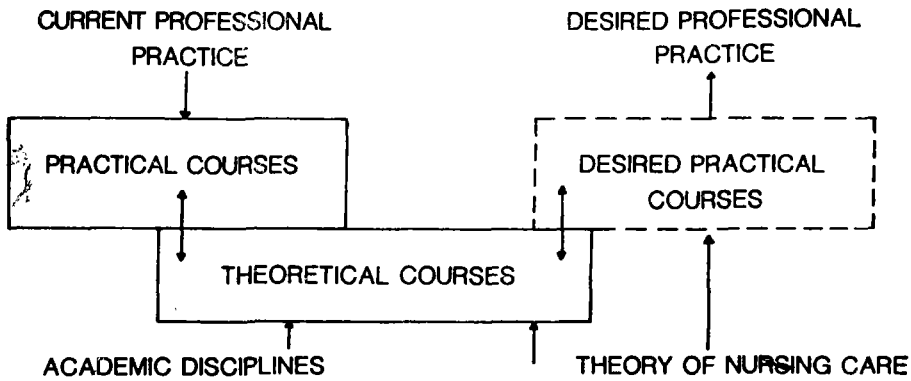

Figure 2 Theory/practice relations in a change perspective (from Askling, 1987)

The courses which cover theory reflect not only the traditional science disciplines but the new and rather normative discipline of nursing care which embodies theories of desired practice. The educational institutions concerned are consequently left with the delicate problem of balance between current and desired practices and between hard and soft disciplines — a problem which they solve in different ways. Some of them continue in the traditional way; others try to make a radical break.

These examples taken from the medical sector illustrate three important problems that became visible in connection with the reform: the composition of the student body which may vary over time due to admission rules but also due to competition: the theory/practice relationship; and the present/future dilemma. These problems are in no way unique to the medical sector but are likely to be found anywhere in vocational higher education. As the student composition varies constantly, most education programmes find it natural to adjust the treatment accordingly and perhaps also their certification requirements. Less often the change becomes so evident and the reasons so easy to pinpoint that a change in rules is achieved.

The present/future dilemma is also characteristic of vocational higher education. Most research-based education programmes try to introduce new ideas, theories, methods, and empirical results that are expected to influence future professional practice. But in most cases the desired change is gradual and less explicit than in nursing education. When current practice takes up only a small part of the training programme, the confrontation becomes less noticeable within the educational system but possibly more so after graduation.

The standard model of theory/practice relations is clearly seen in the education and training of physicians. The programme traditionally starts with courses in anatomy, histology, biochemistry, physiology, etc. These

academic courses in basic biological sciences are followed by clinical courses in medicine, surgery, psychiatry, radiology, and a number of other clinical fields in which academic course work and introductory clinical practice are integrated. General training prior to certification is concluded with an extended period of varied practice under supervision.

The critics of this type of programme argue that the introductory years are too isolated from the clinical part of the programme and from professional practice. Such a programme attracts students and produces doctors who become overly oriented to the roles of scientific medical technicians with little of the holistic approach to the human patients with whom most of them will deal in their future professional practice.

Many different attempts have been made to achieve a more harmonious relationship between theory and practice in medical education. A radical solution was introduced at McMasters University in Canada, and a similar approach is now being tried in Sweden at Linköping University. The basic years are taught according to an integrated model. Both instruction and independent study are centred around problems and cases from medical practice into which the basic science components are brought. Moreover, part of the programme is common to the education of physicians and nurses, and both courses start with an introductory course about man and society. At Linköping, the medical sector of the university and the communal college for para-medical education work together under the name of Hälsouniversitetet (the Health University). It is too early to evaluate the results of this integration, but the students seem to find it most meaningful.

Scientific and Non-Scientific Knowledge Traditions

The comprehensive reform of higher education in Sweden led to the upgrading of several para-professional training programmes to academic status. Nurse education is a good example. Preschool teaching is another. A decade earlier or so a similar upgrading took place for classroom teaching, social casework, and journalism.

The prefix "para" in para-professional may be interpreted as "similar but not quite". Most occupations in this category seem eager to get rid of the prefix and to approach the more prestigious status of the established professions. The standard route for their further advancement within the system of higher education is "scientification", which may include the establishment of their own research disciplines. Once again, nursing care is a good example. Curriculum and didactic research forms a similar route for teaching; social research, for social casework; mass communication research, for journalism, etc. Typical of all of these non-traditional "disciplines" is their multidisciplinary content and methodological diversity. This situation leads to difficulty in building up disciplinary cores which are sufficiently strong to compete with the established disciplines from which the first holders of professorial chairs in the new disciplines also tend to come. In addition to these difficulties, several critics argue that scientification may deprive the training offered of important qualities that are necessary for skilled vocational performance.

One such critic is the German sociologist, Gernot Böhme, who summarizes his conclusions in the following way:

"The (struggle) for (the) professionalization of nonscientific traditions means (their) transformation into scientific knowledge. The reason for this is not the superiority of science over other types of knowledge but the fact that in our societies social chances are to a large extent distributed according to knowledge certificates.

Science and nonscientific types of knowledge differ structurally. These differences form the fundament of a different functionality. Whether science or nonscientific knowledge is required depends on whether a personal, empathetic relation to the object concerned is necessary or not, whether you need a rather particular and regionally adapted competence or not, whether a more holistic or a more specified approach is adequate". (Böhme, 1983, p. 32—33).

Another critic of scientification is the Swedish mathematician, Gunnar Bergendal, who was the Secretary General of the U68 Commission which prepared the reform of 1977. One of the commission's ideas was that all higher education should have what was called a "research connection". But according to Bergendal, this link was not to be interpreted as a strong tie to formal scientific research. Instead, the commission wished to avoid academic drift and stressed the pluralistic basis of higher education, each programme being expected to develop its conditions and objectives according to its own needs.

The "research connection" was to be interpreted as a recommendation in favour of self-examination and reflection on the relevance of given programmes and a critical but constructive attitude to knowledge defined as the qualitative aspects of learning which have as much to do with general as with vocational education. The warnings against academic drift, however, got lost in the implementation process, and presently Bergendal is much concerned about what may happen to the nonscientific knowledge traditions, to practical know-how, and to "personal values in some of the vocational programmes, for instance, nursing and teaching, which were integrated as a result of the 1977 reform (cf. Bergendal, 1984 and elsewhere).

The critique of scientification has been extended to all education preparing for high-level vocational practice by Donald Schön, professor of urban studies and education at the mighty M.I.T. (Massachusetts Institute of Technology). He argues in books like, *The Reflective Practitioner* (1983) that nonscientific knowledge traditions should be complements to science. Schön's concept, "reflection on reflection in action", might be a more appropriate interpretation of the U68 concept, "research connection", than the scientification of all higher education.

The views of Böhme, Bergendal, and Schön, which come primarily from the outside, are not, it seems, shared by the insiders of vocational education to any great degree. Perhaps the latter are convinced that the nonscientific traditions are strong enough to survive even with some scientification. Within universities, however, one tends to find an opposite concern about a possible "descientification" of the traditional disciplines as a result of their integration into vocational programmes.

In my description of the Swedish system following the 1977 reform, I mentioned that all the lines within the five sectors are defined from a vocational point of view even though some of the vocations in question had more-or-less to be invented in order to make the system consistent with its basic principles.

The concern about descientification has been most strongly voiced within the faculties of social sciences. Parts of traditional subjects such as economics, political science, sociology, psychology, and statistics have been taken out of their disciplinary contexts and recombined in lines which prepare for public administration, personnel management, etc. Other subjects such as economic history and social anthropology have had difficulties in finding even small niches in the line system. For both types of subjects, the vocationalization of the line system has resulted in a decrease in the numbers of students who qualify for research-based education in the corresponding disciplines which require three or four semesters of prior undergraduate preparation. The argument has also been made that the new lines, with their many small and diversified courses, foster a more superficial attitude to studies than what prevailed before the reform.

This critique has resulted in some modifications of the line system. It has again become easier to make up individualized programmes consisting of the old disciplines as building blocks. The undergraduate degree of Candidate of Philosophy has been reintroduced with the requirement of at least three semesters in one discipline — identical to the requirement for admission to a doctoral programme. Another development in the same direction is the new possibility of combining the steering committees for undergraduate and graduate education in a given field into one organ. Here is another example of the modifications made in the unitary system as the result of criticism made by the stronger and more established side of higher education.

Regionalization

Swedish higher education institutions are of varying types and categories. Thus the system, which is so highly uniform in terms of programme structure, is somewhat heterogeneous when it comes to institutional organization and resource distribution. Six universities have broad programmes including research and research education. Seven of the institutions are specialized professional schools with permanent research resources. One of these is under the authority of the Ministry of Agriculture, and another one of them is a private institution (the Stockholm School of Economics). In addition, there are 14 regional colleges which do not have research resources and 54 communal colleges, also without research resources, most of which offer para-medical education. In addition, Stockholm has 8 colleges of art, music, theatre, etc. Outside Stockholm, artistic education is integrated into the universities.

The institutions having permanent research facilities have primarily nationwide responsibilities. They are also charged with a special obligation to support the "research connections" in the regional colleges in their respective parts of the country. The regional and communal colleges are more explicitly expected to be resources for their regions. Four different functions for them have been identified (UHÄ, 1985, p. 32):

— a service function giving people, enterprises, and public institutions in their respective regions access to educational facilities;

— an incentive function for the economic and industrial development of their regions through their services as bases of knowledge and of specialized training;

— a localization function by which people and enterprises are influenced to move to the given regions or to stay in them;

— a stimulation function for the cultural lives of the regions.

In practice, these four functions interact with one another. It is likely that the geographical distribution of education which was the primary function is no longer the most important among them. The recruitment effect is weakened by two factors. In some of the regions, a large part of the population lives outside a comfortable commuting distance from any of the regional colleges. The other factor attenuating geographical availability is the rather restricted programmes of the smaller regional colleges. Many of them having developed from schools for classroom and preschool teacher education have not changed their recruitment patterns. Other institutions, like the only school for librarians, maintain their national recruitment. Although additional programmes have been set up in many regional colleges, growth has been somewhat slow as a result of economic restrictions not foreseen when the reform was planned. But in the last few years, an expansion primarily in the technical and the economic sectors has begun in a close relationship with the regional economies.

The incentive and the localization functions have been increasingly stressed in recent years. Even in these cases, the greatest influence is felt in or nearby the cities or towns in which colleges are located, but the impact may also be favourable for the larger area. Local and regional funds have been set up in most regions in order to support research and development activities with public and private money from outside the education system. Strong political support exists in favour of the creation of permanent resources for research in the regional colleges. On the national level, on the other hand, a firm decision has been taken not to distribute permanent research resources to units other than the universities and the professional schools that already have them. This decision in no way prevents competent researchers who are teaching at the regional colleges from obtaining support on a project basis from research councils and foundations operating at the national level. Additionally, a certain amount of time for research is granted to undergraduate teachers who hold the doctorate.

Comparative Study of Reform Implementation

Ladislav Cerych and Paul Sabatier of the European Institute of Education and Social Policy have studied the implementation of some European reforms of higher education, among them the British Open University, the Polish preferential point system for admission, the regional colleges of Norway, the French University Institutes of Technology (IUT's), and the Swedish admission of adults based on work experience.

Cerych and Sabatier call their report "Great Expectations and Mixed Performance" (1986), and such is the situation. In their final comparison, they draw a number of important and instructive conclusions about what makes for success or for failure.

One feels intuitively that the larger the scope which a reform is intended to cover, the greater the risk for failure. But scope is a complex concept, and the authors identify three dimensions within it:

— "*Depth of change* indicates the degree to which a new policy goal implies a departure from existing values and practices of higher education".

— "*Functional breadth of change* refers to the number of functional areas in which a given policy is expected to introduce more or less profound modifications".

— "*Level of change* indicates the target of the reform": from the whole system down to a single primary unit (op. cit., p. 244).

In general, a reform which is radical in all three dimensions is not likely to succeed, but if one or two of its aspects are narrow, it may without risk be radical in the other one or two. As an example of a successful reform, they take the British Open University. They classify it as a narrow reform in that it pertains to only one institution and leaves the rest of the system intact. It is also narrow in functional breadth. Although its admission policy and its forms of distribution are considered radical, it adheres to traditional, highly valued standards with regard to degree requirements and to teacher qualifications. But within these limits, the British Open University represents rather profound reform.

On the other hand, narrowness in all three dimensions does not guarantee success, because such reforms, as the authors express it, "do not galvanise sufficient energy to overcome inertia in the system" (op. cit., p. 248).

Scope is just one factor in the results of implementation. Monitoring the implementation process through evaluations and successive modifications, adequate rewards and sanctions, and strong leadership are other important factors.

Cerych and Sabatier conclude their analysis with the following words: "... all the reforms studied here, and reforms of higher education in general, whatever their degree of success or failure, represent a mixture of achieved, practically achieved, and unachieved goals, with intended and unintended effects as well as positive and negative results" (op. cit. p. 256).

It is therefore not surprising that a long period of time may pass between the planning of a given reform and its full implementation — a period during which changes in planning assumptions and policy priorities occur as the result of external changes. The goals which are filtered down through a multilevel and complicated system of collective and individual actors become distorted as they move towards actual implementation. So even without open resistance, things are likely to happen that were not intended and foreseen when the political decisions were taken. "Great Expectations and Mixed Performance" is really a very appropriate title for a book on reform implementation.

Concluding Remarks

To sum up some of my views on the Swedish comprehensive system which I have had the opportunity to observe from many different perspectives:

The reform is definitely one which has entailed major changes for a large part of the post-secondary system, a wide functional breadth, and system-wide influence. Although I have evoked several critical aspects, I am not willing to call the reform a failure. It is a "mixed performance" to be judged against

great ambitions and great expectations. Moreover, ten years is a short period in which to reach a final judgment.

The most striking characteristic of the Swedish reform is probably the integration of general, vocational, and further education within one national system without any clear-cut distinctions between the three functions. All lines within the scheme of sectors serve both general and vocational purposes although with differences in balance between the two functions. Most separate courses recruit both regular students of varying age and persons who explicitly use them for specialized further training for their occupations. This type of integration makes the Swedish system different from most other national systems which have different tracks for different types of post-secondary education.

The unitary system has both positive and negative aspects. It is a step towards the equalization of the statuses of the three functions and may in the long run improve equality of participation. But in situations in which all or most of the lines are housed within one and the same local unit, and this is the case in the large universities, there is a risk that the different lines will lose their identities. They find it difficult to communicate with their opposite numbers in society outside the university: for instance, engineering or business economics with industry, or teacher training with the school system. In some universities therefore, units located between the university level and the departmental level have been organized in the form of "schools". These units have easily identifiable names, for instance, the Schools of Technology at Lund and at Linköping, and the School of Business Administration at Göteborg. It is necessary to differentiate between steering and administrative functions that are best undertaken at the university level and those that are better delegated to self-governing units at the intermediate or the departmental levels. A school of business administration, for instance, gains prestige from belonging to a university but needs efficient direct contacts with those who are going to employ its graduates.

The principle of vocationally defined sectors was, at the start, applied too rigidly. It functioned as a strait jacket that made new combinations of disciplines difficult to achieve and pushed back some disciplines to a marginal position. The resulting effects were negative, not only for the recruitment to research education in these fields, but also, with regard to the breadth of general and liberal education.

The incentive structure within the system still puts a premium on research versus teaching. Fields without scientific or scholarly traditions try to raise their prestige by means of academic drift, possibly even at the expense of the quality of teaching. A redefinition of the concept "research connection" is needed. The new territories of scientific research may be better served within the traditional structures of specialized disciplines, recruiting research students from new groups, rather than in newly constructed multidisciplinary "disciplines" (cf. Clark, 1987).

Some of these problems have been reduced by modifying decision-making organs and by granting increased freedom to individual programmes. New programmes have been created to fill gaps defined by the occupational demands of developing industrial fields. Local variations have been given additional room. In this successive modification process, it is necessary to build on a basis of systematic and continuous evaluation, not on local and influential pressure groups.

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HIGHER EDUCATION AND EMPLOYMENT IN EUROPE: SOME SELECTED ISSUES *

Bikas C. SANYAL

I. Introduction

Whatever the political ideology of a government, the employment of graduates of institutions of higher education is considered an essential element of national development. Not only is the employment market at the core of social and economic development; not only does it determine the productive life of an active citizen but every citizen is entitled to have a social role to play via gainful employment.

The Problem of Graduate Unemployment

As a result of economic stagnation, the employment intake was slower during the last decade than in earlier periods. We have attempted to examine the situation in the Europe region of Unesco on the basis of statistics available at the International Labour Organization (ILO) [1]. Unemployment statistics are available for 12 countries in Europe (including Yugoslavia, but excluding other eastern European countries). In most cases, the period referred to was the 1976-1985 period. The exceptions also fall within this period.

Although general unemployment has increased in all the European countries except Finland, statistics on its level in relation to the educational level of the citizens concerned are not available for most countries. The ILO publishes statistics on unemployment according to different categories of occupation for the countries in which those figures are available. The two occupational categories defined as "professional, technical, and related workers" and "administrative, executive, and managerial workers" consist mostly of graduates, that is, of people who have successfully completed third-level education. The unemployment situation in these two categories thus refers mainly to graduates. According to the ILO, the number of unemployed people with previous employment experience in these two categories has increased in all of the industrialized market economy countries during the last decade. In the Federal Republic of Germany, for instance, unemployment figures for the professional category alone rose from 118,500 in 1976 to 279,400 in 1985; in Finland, for the same category, they rose from 3,000 in 1976 to 9,000 in 1985 [2].

* This article is a shortened and slightly edited version of the paper which the author presented at the symposium. It expresses his personal opinions and does not purport to represent the official position of IIEP or of Unesco. It is based on a book by the author entitled *Higher Education and Employment: An International Comparative Analysis.* The Falmer Press, United Kingdom, and Unesco, Paris, 1987.

Particularly striking is the fact that the growth rate for unemployment among high-level professionals, both at the administrative and managerial level and at the professional/technical and related level, was higher than the growth rate of general unemployment during the same period. One of the principal causes of the unemployment among these categories of job seekers has been the undue expansion of higher education which has not been matched by corresponding economic expansion. Several explanations for this phenomenon are given below.

Economists argue that investment in human resources has been a powerful factor for economic growth. The rates of return on such investments, although calculated very approximately and sometimes arbitrarily, were shown to be as high as, if not higher than, those for other kinds of investment. Thus, more and more money was invested in education, with the institutions of higher education receiving a large share of it, which was thought to be justified by salary differentials, even though the latter in turn were based on educational differentials.

There were also social as well as other reasons for expansion. For example, in many of these countries education came to be considered a basic human right. Also, with improved communications systems, the benefits of higher education were more readily perceived. Most institutions of higher education charged very low fees, while the special economic incentives, as well as the prestige and the power attached to the jobs, supposedly waiting for graduates of higher education, attracted more and more students.

Similarly, political factors contributed to expansion of higher education. For all the countries concerned and for all the regions of these countries, an institution of higher education was a symbol of national or of regional prestige. Economic criteria received little attention in the establishment of many of the institutions of higher education, and the question of how employable the graduates would be often received none at all.

The rapid expansion of higher education has created as many problems as it has solved. Chief among the former are the following: 1) lack of confidence on the part of the key production sectors of the economy in the institutions of higher education, the result of the lack of any interaction between them; 2) the increased expectations of students which cannot be met; 3) most importantly, the mismatch in both quantitative and qualitative terms between the outputs of the systems and the capacities of labour markets to absorb them. The latter problem has come to the fore with regard to the unemployment and the underemployment of university graduates, especially those qualified in the liberal arts. Its reverse has appeared in the professional fields in which fewer graduates have been produced than have been needed.

To be fair, we should note that the authorities of higher education have been partly handicapped by the erratic behaviour of the employment market. It has been difficult for them to assess the absorptive capacity of the economy, or to forecast manpower needs. The principal difficulties have been lack of information of 1) the resource potential of the given country; 2) changing technologies and labour productivity; 3) educational needs for different kinds of jobs; 4) occupational mobility; 5) attitudes and expectations of potential employees and employers; and 6) the recruitment and the promotion practices of employers. Furthermore, even if such information were available, economic uncertainties would still prevail. These difficulties can only be tackled by making

the system of higher education more flexible in order to respond to changing economic priorities.

In this context, the International Institute for Educational Planning (IIEP) launched a research project to relate the development of higher education within a country to the changing needs of its employment market in both quantitative and qualitative terms so as to improve the basis for planning the development of higher education and to reduce the mismatch between the type of training offered by the institutions and the types of skills needed by the labour market.

The approach taken by the IIEP with regard to this project has put the actual operation of the education system and the labour market to the test, whatever the model of development strategy that a country has.

With this broad approach, the Institute included in its research, covering 21 countries around the world, four countries from Europe: France, the Federal Republic of Germany, Poland, and the USSR. While the details of the research, including its methodology, its findings, and its implications for planning will be found in the individual books/monographs [3], we state below some selected findings and their implications for the planning of higher education.

II. Implications for Higher Education Planners in Europe

In the study, we analyzed the following four aspects of the relationship between higher education and employment for a selected set of countries: the determinants of demand for higher education, the delivery system and response to the demand, the transition from higher education to work, and the world of work itself as perceived or experienced by three groups of people: students, graduates, and employers. The findings of these analyses provide us with some hints for the planning of higher education which are discussed for each aspect of the relationship mentioned above.

1. Implications of the Analysis of the Determinants of Demand

Our study shows that the phenomenon of "mismatch" between the development of higher education and the employability of graduates exists in varying degrees in both the centrally planned economies and the market economies. The centrally planned economies, with manpower forecasts as a technique for educational planning, are facing problems of employment revealed through the underutilization of qualifications and the "misemployment" of graduates. The market economies, on the other hand, have overexpanded their higher education systems because of increased social demand and lack of concern for the employability of graduates.

A large number of well-known problems make manpower forecasting, as the sole basis for educational planning, extremely difficult.

The broader goals of education which generate the social demand for higher education are, by definition, not employment oriented. Whatever the context in which an educational planner works, he can ignore neither the rising expectations of citizens nor the social goals of democratization and the cultural appetite of people for education. One may therefore come to the following conclusion: planning for higher education should be based on a combination of manpower and social demand approaches. For the guidance needed as to the direction

that the development of education in general, and higher education in particular, should take in quantitative terms to cater to the future needs for skills, the manpower approach is helpful if unemployment and underemployment are to be controlled. At the same time, to meet rising expectations and to achieve social democratization, the social demand for education has to be examined. The disciplines to be used in applying one or the other approach must be chosen to suit the different objectives.

These necessities are reinforced by the advance of technology, especially in the industrialized countries. The size of the employed workforce as it has been traditionally defined may not increase to the extent that the economically active population will increase [4]. To achieve full employment in any country, it will be necessary to redefine employment as any useful social role that an individual plays in society for its preservation and development. Governments will have to formulate policies to recognize these roles economically and socially, thus strengthening the part played by social demand in educational planning.

Hints for the plannning of higher education also emerge, according to the study, from the individual determinants (microcharacteristics) of demand for higher education. The results of our surveys show that professional career motives are the most important factors in the generation of individual demand for higher education. Bursary incentives play an insignificant role in creating demand for specific types of higher education.

The analysis of the individual demand for higher education leads us to conclude that study for its own sake comes next in importance after career motives as a determinant for such demand, with variations according to the sex of the student. In some countries, females give a higher score to this factor than do males. This fact reinforces the socio-cultural role as a motivating factor for education. In the choice of disciplines, factors such as a student's sex, the economic and occupational status of his parents, and his region of origin play important roles. Medicine and teaching are more popular with girls, boys being more interested in engineering and agriculture. Such preferences also have implications for the planning of higher education and leads us to the next hint for planners.

The socio-economic status of students influences the choice of disciplines in higher education. Urban, male, and higher income group students demand career oriented higher education more than rural, female, and lower income group ones.

Thus we are led to a further consideration:

Achievement of a better match between supply and demand calls for the inclusion of the individual socio-economic characteristics of students in the context of the country concerned in the analysis of the relationship between higher education and employment.

2. Implications of the Analysis of the Delivery System

To respond to demand, each country has developed a delivery system for higher education.

Our analysis of the countries under review indicates the following:

Centrally planned economies have emphasized the manpower approach for the development of higher education and have adopted access policies principally to meet manpower objectives. Market economies, on the other hand, have

adopted access policies oriented towards meeting the individual demand for higher education.

Another feature of the access policy is related to the process of democratization in terms of which socio-economic background plays an increasingly important role in admissions policies through "quota systems" or assignment of "preferential points" to traditionally deprived sections of society. However, academic performance still plays a dominant role in admission to higher education, a fact which leads us to the following consideration: access to systems of higher education are used as screening device to regulate both academic quality and social mobility.

Given the problem of the employment of higher education graduates, access policies should vary according to discipline. Professionally oriented disciplines should place more emphasis on manpower needs, while the liberal arts disciplines should place more emphasis on meeting the individual demand for higher education.

A feature of the policies of access to higher education in the countries under study is the increasing recognition of work experience as an admission requirement, a practice which certainly has its merits.

Regarding the structures of given higher education systems, one should note the diversity that is developing in the delivery of higher education. Traditional university-type education is being supplemented by short-cycle programmes.

In the industrialized economies at present, the demand for higher education goes beyond the desire for higher income. It is increasingly sought for cultural reasons such as prestige or to help one play a visible role in society. The offerings of higher education are changing in favour of increased numbers of science and technology-based programmes. In the Eastern European countries, the proportion of engineering enrollments is in general much higher than in other country groups.

In addition to the development of the traditional format of higher education, various countries are attempting to restructure their systems of higher education so as to adopt them to changing social needs. "Shadow education systems" are developing in some countries in the world of work. In Europe, including the USSR, the most common form of the latter is "recurrent education", usually undertaken in alternation with work after leaving school. The Federal Republic of Germany, Sweden, and the United Kingdom, among the market economy countries of Europe, have developed these programmes to suit the changing needs of the employment market. The increasing need for workers to participate in management, the growing tendency of companies to meet their employment needs through the upgrading of their work forces by means of internal resources rather than by depending on the external labour market, and the specific types of skills needed by different industries have been the motivating factors for the organization of adult education in the Federal Republic of Germany. As a result, about 40 per cent of all firms with 50 employees or more were already making provision for such education in 1974. Training could take place, depending on the purpose, either "on the job" or "off the job", with paid educational leave.

The Eastern European countries have similar programmes for the training of workers. In some cases, the investment in them exceeds the investment in formal education.

In short, education today has ceased to be the monopoly of a formal education systems. Nevertheless, attempts to relate education to work are also being undertaken in the formal education systems. Reference has already been made to the recognition of work experience for university admission as a partial substitute for formal education.

Of the many new models being developed for the structuring of higher education in response to societal changes, one involves the setting up of cells, centres, or institutes in relation to particular problems faced by given countries. A second model is based on problem-centred interdisciplinary schools. A third model involves the setting up of universities for national development, each of which is a prototype based on several university-area divisions which in turn are broken down into a number of problem-oriented departments [5]. A fourth model is constituted by the "Open University" of the United Kingdom, and a fifth, by certain "Co-operative Education Programmes" in the United States.

Students in co-operative education alternate between periods of study in colleges and universities and periods of employment in business, government, and non-profit-making organizations. Employment areas are directly related to academic areas. Depending on specific circumstances, such work experience is given due academic credit and may be remunerated (as in the USA and the United Kingdom) or voluntary (as in the Federal Republic of Germany). The main characteristic of these programmes is that they are organized from within the education system in an attempt to develop a closer relationship between it and the world of work.

As trends based on these models develop, the task of educational planners becomes more complicated. Before the planning process can start, the diversification of the delivery systems of education needs to be understood and studied carefully. The functional differentiation between various educational programmes — i.e. their complementarity, supplementarity, and conflict — must be identified before one can plan for the development of one educational programme or another.

Analyses of the operations of education systems as perceived by students, graduates, and employers reveal that professional career guidance in all the countries being studied leaves much to be desired. The same analyses have revealed that student mobility within the various education systems is significant. This area, which has been one of the least studied in the analysis of the relationship between education and employment, brings us to a further consideration:

If sufficient information on the potential mobility of students between fields is available, it becomes possible for the planner to take it into account in order to adjust intakes to different specializations.

Regarding the arrangement of instruction to make it more responsive to the needs of the world of work, a clear indication for educational planners exists which is as follows: the incorporation of work experience into formal training programmes is the arrangement which students, graduates, and employers prefer; however, a corollary has been observed to the effect that out-of-school training cannot replace formal training, but can supplement it.

3. Planning Higher Education for a Smoother Transition of Graduates to the World of Work

The dominant cause of graduate unemployment is, of course, the stagnation of economic growth in the face of expansion in the supply of graduates. Compared to the 1960—1970 period, the average annual growth rate of gross domestic product during the 1970—1982 period decreased from 5.1 to 2.8 per cent in the industrial market economies [6]. Another cause of the unemployment problem has been the growth model adopted by different countries favouring more capital investment than labour investment.

If in market economies salaries were fixed on the basis of the demand and the supply of graduates, the increased output of graduates would have reduced the salary structures for graduates, thus reducing the demand for higher education. However, all graduates, so far, have ended up with some kind of employment even if they have had to wait for it a certain amount of time, and university graduates have had better chances of employment than non-graduates. Therefore, the demand for higher education continues to increase.

In Europe, another cause of unemployment is the high and rising level of wages which is revealed through steadily increasing capital/labour ratios. The continued rise in real wages relative to the value of output has had an adverse effect on profits, and the decline in profitability has led in turn to stagnation in investment and job creation. Views differ with regard to this process. Some researchers, for instance, are of the opinion that "substitution of capital for labour takes place because of factor prices and that given a certain technology, labour and capital are largely complementary, especially in large-scale industries with a high technology content. As a consequence, unemployment is more likely to be caused by deficiencies in the process of capital accumulation — i.e. lagging investments" [7].

Another reason for rising graduate unemployment is the increased labour force participation rate among graduates, particularly women graduates.

Lack of interaction between employers and institutions of higher education is another problem cited by a large proportion of graduates. Lack of proper information about where the jobs are available and how to obtain them is also cited as a reason for graduate unemployment. Educated unemployment is frequently blamed on mismatches between aspirations and opportunities. Finally, employers frequently prefer non-graduates to graduates if the specific job conditions permit it, employing persons with lower academic qualifications and then training them on the job.

In spite of defects in the accuracy of manpower forecasts, a view held is that these forecasts can indicate broad directions as to the development of higher education. Likewise, identification of the cause of graduate unemployment helps us to formulate some suggestions as to how to reduce the problem.

In the centrally planned economies, the organizational forms of enterprises, the ways in which work is organized, the system of wages, and recruitment practices have to be reformed on the basis of sociological analyses of the behavioural patterns of those concerned. The schooling system has to adjust to such needs as well. The issue of "work ethic" is important for a socialist citizen who is guaranteed employment.

The industrialized countries, particularly those of Western Europe, will have to return to "true" prices for both capital and labour to achieve a balance

among the production factors that would be more favourable to labour. The present approach based on "cheap" capital and "costly" labour will require some modification.

Technological advancement has led fewer and fewer people to produce, but requires more people to invent, design, distribute, and sell. Thus, the service sector still offers possibilities for the creation of employment. In addition, some thinking has occured about the generation of a non-commercial service sector which would concentrate on the services and needs unfulfilled by the existing public and private sectors [8]. Decentralized operations and initiatives, low investment costs per job, labour-intensive projects, labour costs partially compensated by a reduction in public outlays for social security benefits, and the charging of users for the costs of services rendered are some suggestions for organizing this new sector, which has been termed the "quaternary sector".

The movement towards a new "dualism" in the economies of the industrialized countries, characterized by increased labour productivity in the "open" internationally competitive sector comprising industry and closely related services, together with the creation of employment in those parts of the industrial and service sectors which are sheltered from international competition, has been suggested in some countries as another measure for the creation of graduate employment. Such measures as the reduction of labour costs by means of temporary exemptions from social security contributions by employers for newly hired workers (as in France), employment premiums in the form of flat subsidies paid to firms to avoid lay-offs, and "employment tax credits" offered to employers have all given some signs that they can contribute to increasing employment opportunities in the industrialized countries. Suggestions have also been put forward that job content and work be reorganized so as to improve work performance and increase long-run employment opportunities. The decentralization of decision making and a more even distribution of conceptual tasks have been suggested. It is further believed that these measures would encourage "entrepreneurship" and self-employment which may have to play an enhanced role in future job creation.

An employment policy oriented towards the eradication of discriminatory procedures, the creation of stable jobs in large quantities, and the systematic provision of mobility channels between the various segments of the employment market in order to reduce its segmentation would permit an easier adjustment between the output of the education system and high-level manpower needs. Reduction of working time combined with an adjustment in wages is also suggested as a measure to reduce graduate unemployment. According to a study made in the Federal Republic of Germany, reduction of working time created employment for 824,000 persons in 1979. Registered unemployment was reduced by 549,000. An increase in part-time work could directly reduce unemployment, thus implying that benefits could be derived from splitting full-time work into part-time jobs.

The above suggestions relate mostly to adjustments that might be made in economic policy and in the labour market itself. The education system also has a role to play in the reduction of graduate unemployment.

College and university officials could: (i) act to improve direct data management so as to avoid decisions which add to imbalances between supply and demand in labour markets; (ii) respond appropriately to indicators of imbalance; (iii) work in co-operation with secondary schools to delineate functions, reduce

overlap, and assure programme continuity; (iv) seek to assure as much learning value as possible from college work-study assignments, field experiences, and internships; and (v) indicate to students, especially those firmly committed to the liberal arts or to teaching, how to combine subject matter interests with the development of marketable skills. The development of non-traditional alternatives to the acquisition of credentials in the trades and professions, implying closer links between institutions of higher education on the one hand and business and industry on the other, is also worth exploring. In this respect, work-study programmes with clearly defined objectives should involve carefully selected and motivated students and should link experiential learning to work in classrooms and in laboratories.

Another suggestion is that employers, employee organizations, and educators should work together in ways that are mutually beneficial for learners. The employers should provide part-time student job opportunities and faculty staff development programmes, and they should clearly articulate the qualities they are seeking in graduates. Educators should see to it that learners acquire and practice skills of value in employment. Special emphasis should be given to the establishment of educational information centres, the strengthening of guidance and counselling, and the development of occupational information systems for countries and for regions.

4. The Operation of the World of Work: Implications for Planners

An improved "match" between education and employment will imply better job satisfaction among employees. Although the importance of characteristics which make a job satisfactory varies from country to country, the reward system in almost all countries plays an important role. To have a better match between education and employment, the reward system must recognize achievement in education and employment.

Research also indicates that changes of jobs are common to all the countries under consideration including ones with centrally planned economies. Flexibility of needs in jobs was found to be an important feature of a market economy like that of the Federal Republic of Germany. It mitigates the rigid quantitative relationship between education and employment and indicates potential adjustment of the labour market in the face of oversupplies of graduates in some fields and of shortages in others. The geographical mobility of graduates can ensure the supply of manpower in areas in which they are needed, as in the USSR. Poor housing conditions and mismatches between training acquired and the needs of the job are the most important reasons for changing jobs in centrally planned economies like those of the USSR and of Poland.

Occupational mobility is often necessary if graduates are to maintain their productivity and if a country is to have a balanced economic development. Such changes in jobs are often vertical in the same occupation; one moves higher up the ladder while retaining the same specialization. When such changes are horizontal, from one type of job to another, with a change in specialization, the problem of relating education to employment in quantitative terms acquires increased complexity. The identification of the extent of such changes in jobs may help in reducing this complexity. Knowledge of the reasons for mobility may also help planners in adjusting the supply of education to the demand for employment.

The relationship between education and employment in so far as the employment market is concerned has to consider to what extent training is utilized on the job. Dissatisfaction with the utilization of training was noted to be higher among graduates than among employers. The most striking degree of dissatisfaction concerns the perceived underutilization of training in the centrally planned economies. Among the factors which make an accurate assessment of this phenomenon difficult is the specificity of skills needed by employing organizations for given jobs and the diversity of knowledge to be imparted in any graduate level course. Of course, the problem is much less serious, although not altogether absent, in the professional fields and in technical subjects, and it is here that one can assess the degree of utilization with slightly improved accuracy. In several cases, we have found that graduates gave a clear indication of the utilization of their training in these fields. If such indications are monitored, they can provide useful guidance for improving the utilization of training and thereby the relationship between education and employment.

We can conclude the analysis of the labour market by examining the relationship between education and earnings, as measured by the salaries of workers. Although highly educated people are better paid than others, it does not follow that a more professionally specialized education will, in the long run, yield a higher salary. In fact, the opposite may be the case. The most significant source of salary differences among those with third-level education is age. Other major differences stem from differences in gender, still very pronounced in some countries, and the fact that in all, except those with centrally planned economies, the private sector offers higher salaries than the public sector. Thus, segmentation in society and in the labour market does influence income distribution. Therefore, the role of education in income distribution is limited.

III. A Final Note

The relationship between higher education and employment is very complex. To reduce the "mismatch" between them, one cannot stop with the simple formulation of policy measures. The countries concerned must enact legislation so as to formally adopt such measures. Then, implementation must be followed up through a built-in monitoring system directed in each case, both at the education system and at the labour market.

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II. Diversification of Higher Education with a View to Better Meeting the Needs of Society and of Assuring Employment

THE DIVERSIFICATION OF HIGHER EDUCATION: A VIEW FROM TECHNOLOGY AND INDUSTRY

Luigi DADDA

The question of what sort of higher education system is appropriate for a society which is being profoundly transformed through the impact of new advances in science and technology is certainly a question of fundamental importance. The following reflections have been conceived and nurtured as a result of experience gained as a teacher and researcher in a higher institute of engineering and architecture. By means of it we have had direct contact with a dynamic and diversified industrial environment, that of Lombardy, Italy.

A Changing Society

Why discuss the diversification of higher education? Are our higher education systems not working satisfactorily? What symptoms are we perceiving which are revealing problems which need be solved in ways which are different from what has been done in the past?

The general health of higher education has been very intensively discussed during the past decades, mostly with regard to the extraordinary increases in student enrollments of the years in question and under the pressure of student unrest. The result in some countries has been a restructuring and an expansion of the university systems and in others, the limitation of enrollments through "numerus clausus" or other means.

But these remedies were formulated under the pressure of immediate events; they were only partially derived as the result of long-range planning, and long-range planning is what is needed at this point. What follows are some suggestions as to the lines which such planning should take and some speculation as to the results.

Let us first consider some signs of the evolving situation. One of the most evident is the increase in *unemployment* which is being experienced, to varying extents, in all the countries of the Europe Region. What is somewhat unusual is that it is occurring during a phase of economic development characterized by profound change in industry which is being fueled by increasing automation, particularly in the case of manufacturing plants, and by an insufficient develop-

ment of the service sector, the only sector available to absorb unemployed workers and new entrants into the work force. An analysis of the data on unemployment indicates that a large proportion of the unemployed are young people who are looking for their first jobs (see Figure 1). It is distressing to observe that some of them will never be able to secure seriously productive jobs.

Italy: Unemployment (%) as Function of Age, Sex

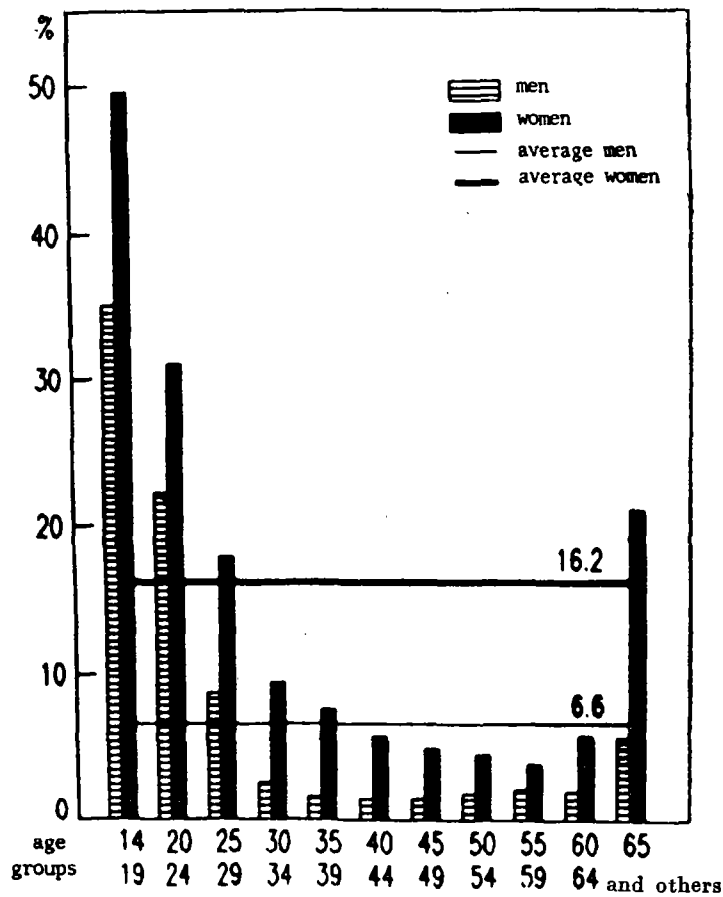

Figure 1

The most important remedies for correcting this situation are beyond the responsibilities of the education system as they derive from the policies of general social and economic development of given countries. Nevertheless, the education system, particularly its tertiary level, plays an important role in alleviating unemployment, for it is responsible for the key factor in social and economic development: the human factor and its cultural background.

A symptom of particular interest for the education system is the development of private enterprises devoted to teaching. They constitute a clear indi-

cation of the growing demand for a kind of knowledge and for skills which are not being provided by the traditional higher education institutions. In addition, many large industrial concerns have established internal training services, often in the form of subsidiary companies and sometimes as specialized private universities. In some cases, however, training is obtained from the traditional universities according to specific agreements. These initiatives should be considered with regard to the fact that the companies in question have large research laboratories in which basic research is often performed.

How should we react to this situation? Is it simply a symptom of an unsatisfactory state of affairs in the traditional teaching institutions or is it an indication of a new situation in which the production and the diffusion of knowledge and of know-how are inevitably becoming activities which are best performed by private enterprises? To respond to this question is a very delicate matter, for the answer is very tightly linked to the general perception of the social system. But even in countries, the social systems of which grant a legitimate role to private enterprise, this trend poses problems since in many of them (notably in Western Europe) professional teaching has traditionally been considered a task, the responsibility for which is assumed by public bodies, controlled by local or by central governments, depending of the political structure in each case.

Table A

Comparison of "Agricultural", "Industrial", "Informational" Eras

		Agricultural	Industrial	Informational
Acquisition and transmission of knowledge	S&T Research Educational	<0.3% GNP < 1% GNP	1-2% GNP 3-5% GNP	⩾ 2.5% GNP ⩾ 6% GNP
Information industries	Electronics Telecom. and informatics	ε	~3%	> 6%
Working population distribution (%)	Agriculture Industry Text & symbol processing Other services	>50% 10-20% < 8% <10%	10-20% >40% 15-25% ~15%	< 6% < 20% > 50% ~ 20%
Mass media	Press, radio, TV, databanks	weak	strong	very strong
Social	Urbanization Social complex International interdependence	25% weak weak	65% strong average	in regression very strong strong
Condition of women	Employment aspiration	weak	average	strong
Demographic factors	Birth rate	> 3%	2,2-3%	⩽ 2,2% (today's trend)

From: A. Danzin, *L'Europe et les technologies de l'information*, 1982.

The symptoms in question, which are directly related to the education system, must be considered the result of the general evolution from industrial society to post-industrial society. Table A illustrates this evolution, expressing it in terms of certain characteristics. Among these, the first listed, the acquisition and transmission of knowledge, seems to be the driving force behind this evolution, the remaining characteristics being logical consequences. If this thesis is accepted, the new post-industrial society is best called a knowledge or an information society. More important than the name is the fact that the acquisition and the transmission of knowledge is the traditional task of university institutions in which research and teaching are strictly linked.

It is important for one to consider this problem in quantitative terms: the quantity of knowledge available for use by mankind is doubling about every six-to-seven years; about 80% of all the persons who, since the beginning of mankind, have devoted their lives to the task of producing new knowledge, are living today. What is happening now never happened before: mankind is experiencing a totally new type of development, one based on knowledge.

Table B

Development of Information Technology

YEARS	I 1945—1970	II 1955—1980	III 1970—1990	IV 1980—2000
Subject	Scientist (Natural science)	Manager (Managerial sciences)	Society (social sciences)	Person (behavioural sciences)
Scope	• Defence • Science + Technology	GNP	well being	satisfaction
Object	Nation	Enterprise	Population	Person (social)
System of values	• Security • National prestige	• Economic • Employment growth	• Social services • Efficient public administration	Self-realization of person in society
Evaluation of results	Scientific and technological results	Efficiency	Solution of problems (efficacy)	Creativity

Elaboration from: "Problems of Japan's Computerization from an International Viewpoint"

In order to better understand what technology, particularly information technology, means for man and for society, let us consider Table B which is self-explanatory. It is worth noting that during the first period (1945—1970), science and technology along with defence problems were the principal subjects of development. During the second period (1955—1980), particular attention shifted to the development of data processing in industry and administration with particular relevance to enterprises. In the following period, attention was directed to society as a whole, the result of the development of large

computers permitting data processing and transmission to be undertaken on a scale sufficient for the solution of the sorts of problems typical of public administrations (Population Registers, Health Services, Tax Systems, etc.). What we are seeing in the present period, one which has followed new and spectacular developments in information technology (notably, the microprocessor which among other things produced the personal computer), is emphasis on the person in an effort to boost his creativity and to exploit it for his self-realization in society.

For those who might object that the above is little more than a superficial vision of reality, an accurate examination of some of the aspects of social development in the last decades demonstrates that society in general is really experiencing a rapid and profound process of evolution, the driving force of which is certainly science and technology and the effects of which are of great relevance for the planning of school systems.

Manufacturing Industry Evolution

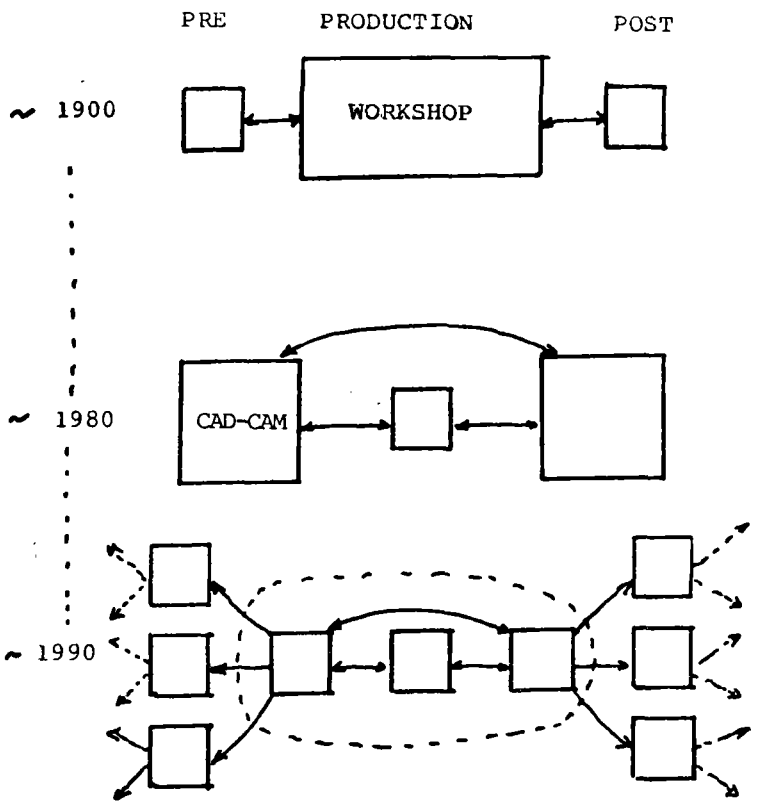

Figure 2

Analyses of the recent evolution of given professions and forecasts of their future evolution are necessary so as to plan for the future of given education systems in such a way as to make them into driving forces.

The evolution of the professional profiles required by industry is strictly determined by the evolution of the structures of given industries. Figure 2 gives a schematic illustration of the course of evolution of a manufacturing industry. From the beginning of the industrial era up to the first decades of this century, most workers were employed in industrial workshops. A small number of employees performed functions auxiliary to actual production such as selling, marketing, invoicing, personnel work, and administration. Beginning with the post-war period, the relative number of workers assigned to the latter functions has been constantly increasing in relation to the growing importance of marketing, research, development and design, advertising, and finance. At the same time, the increasing automation of manufacturing processes has led to a decline in the number of workers needed in production even if it has increased the productivity of those who have remained.

The skills required in the workshop have changed dramatically as a result of the increasing use of electronically controlled (mechatronic) machine tools. At the same time, certain high-level and difficult-to-master skills traditionally required in the old industries have practically disappeared. What is even more important is that new skills are needed for those functions that used to be auxiliary to production but have become increasingly necessary for a successful industry. Consider the cases of CAD—CAM, of market research, of financing, and of management in general.

A new concept has started to emerge: the role of a manufacturing industry, traditionally considered to be the production of physical objects at a cost as small as possible (consider the case of automobiles), is evolving towards the production not only of the basic product itself but of the tools needed to maintain it and of related services intended to satisfy specific general needs of society. A fertilizer factory markets a fertilization service including not only fertilizers but also consultation services for customers requiring up-to-date research.

What has been happening since 1980 has been a further evolution of industry. One line of that evolution has been leading to fully automated factories, an extreme limit of the automation process. Here the number of workers required is very small. Moreover, the skills required of them are totally different from those required in the traditional workshop. The workers in question must have received high levels of training in higher education institutions.

A second line of evolution has been leading to the further development of what used to be known as "auxiliary" functions. Some of these functions have become so specialized and at the same time of so general application that specialized enterprises are being founded in increasing numbers, offering their services to several industries. Sometimes such enterprises are affiliated with given industrial groups but offer their services to other industries. In some cases, even the manufacturing industry is specialized and become the task of small or medium scale enterprises which offer their services on the open market.

Of course, we are not saying that large industries are disappearing. In the type of environment which we are describing, small and medium size industries are enjoying a high birth rate; the industrial systems in given regions are becoming very dynamic. Each of the industries in question tends to be based on rather specific but high level skills, the human factor becoming the main ingredient.

PENETRATION OF DIFFERENT CONTROL TECHNOLOGY IN INDUSTRIAL PRODUCTS

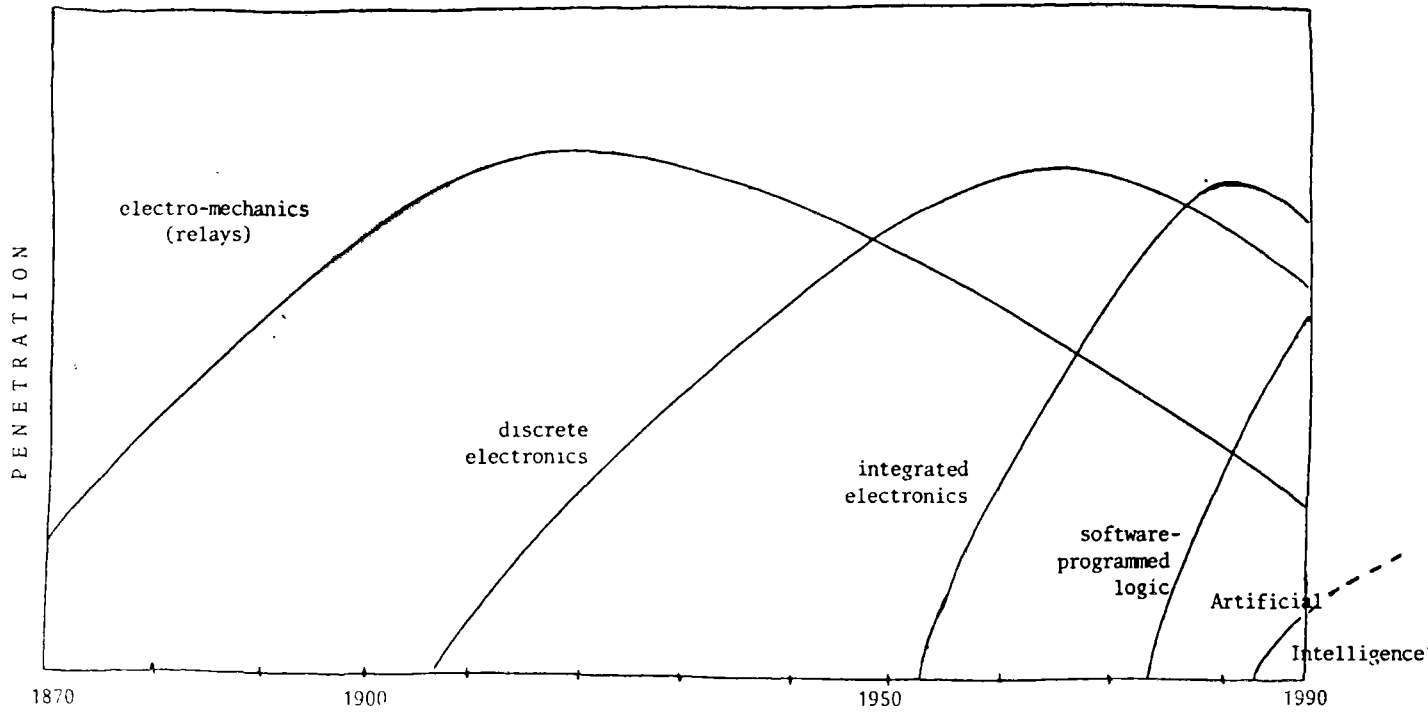

Figure 3

The rapid technological advances which are typical of the present time are imposing increased flexibility, particularly on teaching. The latter situation is well known, but let us illustrate its character and its consequences with reference to control technology, an essential element in the operation of machine tools and even of whole industrial plants. Up until the late 1940's, the basic technology adopted to implement the control function was primarily electromechanical (relays) with vacuum tubes used in the most sophisticated applications. Then came the transistor in the 1950's followed by the integrated circuit of the 1960's, and then the microprocessors of the 1970's. Figure 3 illustrates the "penetration" of industrial products by each technology. I learned the first two technologies as a student at engineering school; later, I had to learn and to teach the succeeding technologies while also doing research. As these technologies are very different from one another, they require the engineer to learn new *basic* knowledge in order to master them, particularly the newest ones. The latter also permit more complicated and sophisticated solutions to problems.

A few years back, the author asked himself what the next development would be and concluded that it would be artificial intelligence. A year ago, the first industrial product embodying this technology (still in its initial phase of development) started to appear on the market.

Other broad technological fields have experienced a similar type of evolution.

Table C

Professions with Highest Employment Increment (1995)

1. Employees for administrative managerial tasks
2. Employees for technical tasks
3. Employees, generic
4. Teachers in dance, singing, tennis, ski, swimming, entertainment
5. Accountants
6. Nurses, health technicians
7. Computer operators
8. Computer programmers, analysts
9. Shop managers
10. Cooks, waiters, etc.
11. Polyvalent (mechatronic . . .) workers
12. Marketing agents
13. Industrial technicians
14. Designers, painters, sculptors . . .
15. Finance, insurance, operators
16. Entrepreneurs, managers
17. Cleaning workers
18. Drivers (taxis, busses, trucks)
19. Shop operators
20. Policemen, firemen
21. Doctors (gerontology, orthopedy, oncology, dermatology)
22. Secondary school teachers
23. Electronic technicians
24. Electrical workers
25. Business, tax consultants
26. Public administration clerks
27. Radio, TV. cinema technicians
28. Engineers (electronics)
29. Biologists, zoologists, . . .
30. Specialized agricultural workers
31. Car repair technicians
32. Hairdressers, cosmetologists
33. Journalists, writers
34. Economists, market analysts
35. Water and heat systems workers
36. Lawyers
37. University professors
38. Carpenters (steel, light alloys)
39. Photographers, phototechnicians
40. Telecommunications workers

Table C is the result of a forecast for 1995 listing the professions characterized by the largest increases in employment. As can be observed, the most significant of these increases will come from the service sector. It also seems that some professions requiring high-technology training (in computers) will be important. But the older professions too will change profoundly (mechatronic workers). Only a portion of the work force will be employed in exclu-

sively high technology industries, but high technology will play an increasingly important role in all forms of production as well as in the service industries.

Societal change fueled by technological advance is a worldwide phenomenon. Thus, each country must conceive of and formulate its economic policies in terms of worldwide markets. Countries are interacting as never before as the result of the development of the telecomunication and the information technologies. Another general effect of these technological advances is that the increased intensity of interaction within society (at all levels: local, national, and international) is being paralleled by a marked decentralization of decision-making power, both in enterprises and in governments. The resulting effect has been an increase in the complexity of modern society: not a static complexity but a dynamic one which explains the rapid evolution of society in general.

Policies and planning at all levels have become complex. Rigidity cannot be tolerated; reality inevitably smashes it. Policies in all fields are increasingly being characterized by flexibility and by deregulation.

What do all these transformations spell out for higher education? To answer such a question is a colossal task. All that this article can attempt to do is to underline some particularly salient points bearing in mind that diversification policies are very necessary and that the larger problems are common to all the countries of the region, regardless of their socio-political systems.

Diversification and Flexibility

Thus *flexibility* is the most important characteristic needed in dealing with the many problems involved. *Diversification* is certainly an important form of flexibility but does not carry its full meaning: diversification applies to organizational structures and curricula in a static sense: flexibility carries the concept of adaptation to a changing world. This preoccupation is not purely semantic. It is a very real preoccupation in that we are dealing with public institutions that, by tradition, and even more so by "culture", tend to be very static and conservative.

Flexible policies, organizations, and curricula should not, however, be considered *the* scope: they are simply instrumental to the real scope of our activity, which is *the student* himself. The higher education institution must be considered as a place in which the capabilities and the aspirations of students are developed, exploited, and matched to the needs of society.

Some conclusions can be drawn from this statement of principle.

How can a student be educated to be a flexible person (we shall limit ourselves to the professional aspects of flexibility)?

A person capable of tackling different kinds of jobs effectively must have been provided with a sufficiently large fund of *basic knowledge* to permit him not only to keep up with advances in his specific field of activity but also to master new basic knowledge. A person may have to master new basic knowledge several times during his working life. The problem then arises as to how to shape basic curricula, given this requirement. How then should basic and specialized knowledge be balanced taking into account the importance of the latter, not only because specialized knowledge is always needed in order to effectively

master a profession, but also because specialized knowledge is a necessary complement to basic knowledge in the search for new knowledge and the elaboration of advanced applications. Well balanced curricula are therefore essential for an educational process aimed at forming flexible citizens.

A discourse on curricula is not complete if it does not consider another aspect of the training of persons capable of being efficient members of society: the development of *imagination* and of *entrepreneurship*. After all, know-how and scientific-technological knowledge are mearly tools, although essential in any human activity. The solution of difficult problems requires *creativity* in addition to imagination. Indeed, *creativity*, which is the most important ingredient of flexible behaviour, is the exclusive prerequisite of a human being, one which cannot be replaced by a computer no matter how sophisticated. Can imagination and creativity be taught? Certainly the development of both can be stimulated through artistic activities. Indeed, a discussion of the question leads, among other things, to a renewed appreciation for the *humanistic* components of curricula.

A concept related to some extent to imagination is *entrepreneurship*, i.e. the ability to conceive and to realize an efficient initiative by combining all the necessary resources. Such an initiative could be an independent industrial enterprise but also a project within the framework of an existing company. The latter possibility leads to the question of the role of entrepreneurship within an organization that could even be a public administration. The possibility leads to a new conception of organizations. Some persons being more entrepreneurial than others, the question arises of how to teach entrepreneurship. It is certainly important to provide potential entrepreneurs with important basic and specialized knowledge in such areas as economics, management, legislation, human factors, and sociology. Again we are brought back to the importance of fostering the training of efficient and flexible citizens.

The university is the most important institution of a tertiary education system (in some cases it is the only tertiaty institution). The basic and traditional concept of the university as a place in which *research and teaching* are given equally important roles appears to be of crucial importance for teaching in the new modern context. The transfer of new knowledge into the teaching process in universities is immediate, for it is done by the same people whose task it is to produce new knowledge. A good balance between research and teaching is consequently of upmost importance.

Sometimes, however, this process is hindered by a certain kind of inertia which is characteristic of the administrative structures of universities. Universities sometimes can be rather inflexible in recognizing the importance of new disciplines. Old, traditional disciplines tend to consolidate themselves at the expense of the new ones which are represented by younger researchers with less decision-making powers in the structures of university governance. The only way out of such a situation is external intervention with regard to the allocation of resources.

A specific and indispensable task of universities is to extract the concepts composing basic knowledge from the flood of new scientific results which are being generated all over the world. The identification and the integration of such concepts contributes to general scientific progress in addition to the solution of specific problems. The task seems to be best carried out when associated with teaching.

Today research is usually undertaken with the support of solid international connections. Interaction among universities and research centres is contributing very effectively to raising the level of research and consequently the level of teaching. Several research programmes have been developed with the participation of the universities of different countries. The European Economic Community, for instance, promoted the Esprit Programme for international co-operation in applied research projects involving universities and industries. A new international co-operation project concerning basic research is being prepared.

A further aspect of the problem of how to promote flexibility is that of the *education of adults*, that is, of their continuing education. This problem, which has frequently been the object of discussion, has given rise to several initiatives for providing opportunities for retraining adults during their working lives. The aspect of the problem worth mentioning in the context of this article has to do with the need, only recently enunciated, that new, basic knowledge be imparted so as to develop flexibility in the evolution of several professions. The rate of advancement of modern technology is such that even basic knowledge becomes obsolete; however, retraining, involving new basic knowledge, is in general more delicate than the retraining required for specializing in or in extending given disciplines. A view held is that in the case of knowledge, the involvement of universities is an appropriate action to take at least for the preparation of teaching materials. Several initiatives have been launched, and a discussion of the experience thus gained could be of great interest.

TECHNOLOGY, HIGHER EDUCATION, AND THE ECONOMY: A CRITICAL RELATIONSHIP

John DENNISON

Introduction: Canada's Post-Secondary Education System

Canada is a federated state with political power shared between two levels of authority, the federal government and the ten provincial legislatures. Under the terms of the British North America Act of 1867, *education* was placed within the jurisdiction of the provinces. No change was made in this arrangement within the Constitution Act of 1982. During the past one-hundred years there has been considerable debate among academics and jurists as to whether post-secondary education was intended by the architects of the confederation to be included under the general rubric of *Education*. Nevertheless, there has been a recognition of the role of colleges and universities in a national and an international context through a funding arrangement agreed to by both levels of government.

Under this arrangement, the federal government transmits to the provinces an amount of money, calculated by means of a complex formula, which is intended to support the recurrent costs of post-secondary education in the provinces. The federal authority exercises no control over the dispersal of these funds, the provinces receiving the money as consolidated revenue, nor does it require any accountability from the provinces as to how its contribution is disbursed.

In none of the major federated states, the U.S.A., Australia, and West Germany, to cite three cases, does the federal government have less direct influence upon the direction and the priorities of post-secondary education than in the case of Canada. The inability to develop and apply a national strategy for higher education, one which would be linked to economic and sociocultural goals, as in the case of Japan, is an issue which has become increasingly critical for planning authorities at various levels of Canadian society.

Nevertheless, and despite its political structures, Canada has developed widely diversified and comprehensive systems of tertiary education within its ten provinces and two territories. Over 250 post-secondary institutions: universities, community colleges, and technical-vocational institutions, have been established (National Forum, 1987). Almost 800,000 full-time students are now enrolled, and an increasing number of part-time students (almost 2,000,000) are pursuing studies by various means, including distance learning arrangements. The colleges, in particular, vary considerably as to mission and function, but all are committed to the provision of extended educational opportunity to students of all ages.

It is not possible to write about a *Canadian* system of post-secondary education. In fact, there are twelve separate and distinct systems in the nation, which, while supporting a comprehensive galaxy of institutions, lack a structure to support or to encourage a sense of national purpose.

In fact, one of the most serious consequences of the constitutional arrangements with respect to the management of post-secondary education in Canada is the inability of the nation to effectively coordinate educational planning with economic planning to the extent that countries such as Japan and West Germany, and even Australia and the United States, have done. The thesis which will be developed in this paper is that economic survival in the new information age will demand an intricate relationship between technological growth and educational innovation. Any society which is unable to develop this relationship seems destined to have major difficulties in competing in the global economic marketplace.

The New Information Age

Much has been written about the nature and the impact of a new post-industrial age which will embody an economy based not upon agriculture, nor upon industrial growth, nor upon natural resource exploitation — but upon access to and the processing of information. In fact, the economy will be knowledge-based.

"In an information based economy, a growing number of people are called upon to earn a living from jobs involving the creation, processing, and distribution of information, and by the same token, a large proportion of natural revenue comes from these activities" (Castonguay, 1987).

The application of human intelligence through the development of new technologies in management and in marketing will determine the survival of Canada in the new global economy. Neither the creative utilization of labour nor the conversion of raw materials into manufactured products will constitute the basis of this nation's wealth in the next millenium. Real economic growth will be impossible without the development of technological know-how.

Peter Drucker, in a recent article in *Foreign Affairs*, provides two examples of the power of knowledge . . . "the manufacturing costs of the semiconductor chips are about 70 percent knowledge — that is research, development, and testing — and no more than 12 percent labour. Similarly with prescription drugs, labour represents no more than 15 percent with knowledge representing about 50 percent" (Drucker, 1986). In a similar vein, the *Economist* (1986) notes that a recent study revealed that 15 percent of overall productivity growth in American and Japanese industry comes from changes in the use of labour; 25 percent, from capital investment; but no less than 60 percent, from technological change.

The technological revolution can be experienced through many forms, such as telecommunications, decision-making software, laser printers, biogenetics, fiber optics, etc., but these developments all translate into one fact — that a society which is not prepared for the technological revolution will be unable to compete within the global economy, and this will have disastrous consequences for the quality of life of any nation highly dependent upon international trade.

The full effects of innovation in societal technology for the next generation are difficult to assess, but as Masuda (1980) notes, one thing is clear, "it will bring about fundamental changes in human values, in trends of thought, and in the political and economic structure of society".

One segment of society which will be dramatically affected by these changes will be the post-secondary educational system, and it is to this particular aspect that the remainder of this paper will be addressed.

The Role of Post-Secondary Education in the New Economy

There is little doubt that the knowledge-based society will emphasize the overwhelming and complex relationship between technology, education, and the economy. Technological advancement will form the basis of economic growth, but the quality of technological skill will depend upon the kind of education and training provided.

Post-secondary education will face two kinds of challenges if it is to play an effective role in accommodating the impact of the new technologies. The first is the way in which young people must be prepared if they are to survive in the knowledge-driven workplace. The second is to provide the opportunities for those already established in the workforce to upgrade their skills and to replenish their intellectual armory if they are to be able to adapt effectively to technological changes.

With reference to the choices which workers will face, the *Economist* makes an important observation.

"Two things are certain. One is that, over the coming five years, four out of five people in the industrial world will be doing jobs differently from the way they have been done in the previous 50 years. The other is that, outside a tiny group of technocrats, most people are going to have to go back to school, sooner or later, to learn how" (*The Economist*, 1986).

The issue of accessibility to higher education in Canada is one of long standing and much debate. Recent statistics (Fortin, 1987) indicate that the system in general responds well to the needs of the "mainstream" Canadian: young, white, urban, and reasonably well-off. However, serious inequities exist with regard to particular minority groups, the lower socio-economic stratum, native Indian, and rural residents, for example.

In the context of this paper, the prime concern is with accessibility to technological upgrading under conditions which will match the reality of working life. Mature students require educational offerings which are part-time, easily accessible, and will enable them to integrate study with work. While there have been notable exceptions, Canadian universities are not organized to respond to this type of demand. Few part-time opportunities exist in career-oriented programmes which are scheduled so that professional upgrading can be integrated into the work-day.

Colleges and technical institutes are somewhat more flexible than universities, but the part-time learner still presents a problem for programmes which operate according to traditional formats and for which high demands are registered. The real challenge for all institutions of higher education is the reassessment of their styles of operation in an effort to respond to those

in the workforce who will require a different kind of service than has been the practice in the past.

Furthermore, as technology will evolve at several levels, from basic technical skills to advanced theoretical understanding in the complex information-driven workplace, it will be incumbent upon universities, colleges, and technical-vocational institutes to coordinate their responses in ways which are consistent with the extent and level of the demand.

Without doubt, the post-secondary education systems in Canada have the resources, the capacity, and the management skills to bring their operations into line with the needs of the next decade. But they will require a high level of cooperation from both government and the private business and industrial sectors before an effective response will be possible. Planning a strategy for post-secondary education in the 1990's and beyond will require creativity and courage from all key components of the system. Lifelong learning still remains as much an idea as a reality.

The first major challenge, however, one which is of critical importance, is the initial preparation of the 18—24 age group to perform in a workplace dominated by technological change. Hence it will receive extended attention in the next section.

Preparing for Adaptability — The Role of General Education

As suggested earlier in this paper, the most important weapon in any society's arsenal for survival in the new industrial age is the strength of its human resources. The productive exploration of the entire range of human talent is the most critical task of the post-secondary educational system. People vary widely in their capacities for abstract thinking, in their technical abilities, and in their talents for practical tasks. Nevertheless, no human capabilities should remain undeveloped, and a broadly based system of post-secondary education, operating within a coordinated structure, has the potential to meet this challenge.

However, the provision of education and training is only one aspect. Of far greater significance is the quality of the learning experience which is available. The relationship between "training", and "education" is, of itself, an issue which will require a new interpretation. The consequences of not fully understanding this relationship have been identified succinctly in a recent article by Ronald Watts (1987).

"Here, too, the character of the knowledge-based society has important implications. First, there is a danger that post-secondary institutions will be pressed to become mere training grounds, directed at narrow vocationalism and responding primarily to immediate demands. There is an understandable tendency to demand more technicians, more applied technologists, more vocational skills, more business majors and accountants — all of which are now in high demand. But often, the qualifications being offered have a built-in obsolescence. The genuine vocational need that must be met is for creative and intellectually rigorous entrepreneurial individuals who are broadly informed and outward-looking. Indeed, in a society characterized by change, could the most useful vocational education be one that lays the foundations for a

lifetime of learning, including significant changes in employment or careers over the course of a working life?" (Watts, 1987, p. 9).

If education is to prepare individuals who possess the ability to adapt to rapidly changing conditions driven by technological change in the workplace, one fundamental approach is vital. Irrespective of the level and of the kind of function for which the student is being prepared, a general education component must be incorporated into the curriculum.

While it is impossible to describe in detail the components of general education which will apply to all curricula, the following are offered as essentials in the preparation of an effective participant in the technological society.

Communication skills: The elements of multi-dimensional literacy include not only writing, reading, and listening skills but sufficient familiarity with computer languages to have access to information in its new formats.

Critical thinking: Such comprehension of the scientific method and of the elements of logic so as to be able to analyze and to judge arguments, to raise relevant questions, and to distinguish between rationality and rhetoric.

Interpersonal skills: As so many of the new areas of employment, such as the service sector, will involve a high degree of interaction among individuals at all levels, an understanding of individual differences and motivations will be important tools for vocational survival.

Decision making in society: While the forces of change in society rest upon the nature of its institutions, political, social, and cultural, effective participation will depend to a great extent upon understanding how decisions are made in society by its key components. This aspect of general education involves an appreciation of the historical events that shaped the nature of society, e.g., the constitution itself.

Ethics and values: No better expression of the importance of this subject could be found than that by Claude Castonguay.

"In an information and knowledge based economy, in a world where a revolution is taking place in the field of biotechnology, at a time when the balance of power between the individual and the community or the state is undergoing drastic change, concern for ethical considerations is not an idealistic luxury, but rather a collective duty and major challenge for all educators, particularly those at the post-secondary level. The impact of ethics can be measured in high-technology areas such as biology and medicine, as well as in the arcane vagaries of computerization, a phenomenon which is affecting all spheres, including private life. If we neglected to make a connection between basic ethics and technological progress, we would be ushering in an era of "barbarism with a human face" (Castonguay, 1987, p. 11).

While these components of general education are not exhaustive, they do convey some of the imperatives for survival in a knowledge-based economy.

However, defining the content of general education is one task. Developing a technique by which these concepts can be transmitted to students is quite another. While general education is almost unanimously endorsed among educators, a study of its application in Canadian community colleges indicates that the rhetoric is not always transformed into curricular reality (Dennison and Gallagher, 1986, Sorensen, 1984).

While some notable efforts have been made to incorporate general education into vocational-technical programes, many have not succeeded. The

reasons for this deficiency are several, but the overriding obstacle seems to be a lack of agreement as to how general education might best be integrated into programmes which have job-specific focuses. The outstanding exception is to be found in Quebec, in which all college students, academic and career-oriented, are required to complete a full year of *formation fondamentale*, as a condition for graduation (Quebec, 1978).

Given the critical need to close the gap between education and training, and not withstanding the difficulties involved in the process, it appears that a new and radical approach is needed if the challenge is to be met. One such approach would place general education within an instructional, rather than a content mode, an idea which is briefly explained in the final section of this paper.

General Education: A New Approach

Most attempts to develop an effective program of general education in Canada, within a vocational-training context, seem to have encountered difficulties of a financial, administrative, or time-related nature, when the approach has been content-focused.

The thesis being developed in this paper is that required or elective courses or combinations of courses are *not* the answer, but that the responsibility should be placed upon every instructor to develop a teaching model which is value-based. In this approach, the conceptual themes within general education, outlined earlier, would be inculcated into the instructional model which is used in the classroom, the laboratory, and the shop.

Specific examples of this proposal might be as follows . . .

. . . The development of communication skills apply to all instructional situations in technical reports, laboratory encounters, artistic projects, and simulated job interviews — *all instructors must accept responsibility for these skills*, irrespective of the content area.

. . . Broadly based moral and ethical issues apply within the health sciences, industrial technology, business practices, and environmental studies — and should form part of the appropriate curriculum.

. . . Contemporary issues such as free trade, national identity, the charter of rights, labour relations, unemployment and its consequences, federal-provincial relations — are integral to any programme which prepares an individual to pursue an occupation within a free society.

. . . Classrooms, laboratories, shops, and less formal locations in which interpersonal encounters occur, can be used to create fertile learning experiences involving individuals in varying situations.

The foregoing are mere examples of the ways in which general education may be incorporated into the hearts of instructional programmes. In fact, such actions would be limited only by the wills and the imaginations of instructors.

If this approach is to be implemented, however, two conditions must be met, and both are essential. The first is an unreserved commitment by instructional staffs to inculcate the values and concepts of general education into regular instructional programmes. The second condition is that institutions will initiate programmes of professional development and upgrading designed to interpret their needs for general education and to assist their

instructional staffs in preparing for their roles in the process. Without the support of teachers and without their willingness to prepare for the new challenge, any program of general education will be unsuccessful, irrespective of the volume of resources which are assigned to it.

At the time, this proposal will place a different emphasis upon and a new direction to the professional development of teaching staffs. Much has been written about the decline in vitality within aging instructional staffs and the necessity for an emphasis upon human resource development if faculty members are to retain and replenish their enthusiasm for teaching. A programme centred upon the inculcation of general education would provide a new focus for classroom activities and major challenges for instructors.

Concluding Comments

This paper has addressed one of the most complex relationships in public policy — that which exists between technological change, educational innovation, and economic growth. An information and knowledge based economy will have many implications for the conditions for survival in the workplace of the future — not the least being the adaptability of workers at all levels to technological change.

Like any advanced technological society, Canada will face major challenges if it is to retain its place within the global economic marketplace. Its long-standing dependence upon natural resource development and importation of skilled labour must be replaced by a system which prepares its most valuable resource, its people, to assume a major role in the development and marketing of technological knowledge.

However, if the challenge is to be met, there will be a need to create a national economic strategy which will harness those components of society which are essential to its survival. Foremost among these components is the nation's broadly based post-secondary educational system. An effective educational system will ensure the preparation of sufficient people with the vital skills to adequately fuel economic growth in the new industrial society. At the same time, the system must provide opportunities for those in the workplace to upgrade their skills and to replenish their intellectual competitiveness in order to adjust to changes in technology.

All of the above will be possible only if a national strategy for post-secondary education is activated in such a way as to coordinate economic with educational planning. It will then be the responsibility of the system to provide both education and the training experiences in a manner which will adequately prepare its graduates for the new kind of workplace.

Canada has the resources, physical and human, the management skills, and the energy to meet this challenge, all that remains is commitment.

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COMPLEMENTARITY AND DIVERSIFICATION: TWO SIDES OF A SINGLE EDUCATIONAL PROCESS

Hans-Joachim RICHTER

1. The Extension of the Problem and its Solution

Until recently, a consideration of the problem of complementarity in higher education would be limited to the individual components of a specific discipline (branch of study). Given the unprecedented growth of science and of technology, the rapid emergence of new applications, the need to diversify educational processes, and the requirements of life-long learning, any discussion would concentrate on the following questions:

— how to co-ordinate, in given educational processes, the teaching of basic subjects with the needs of differentiated specializations;

— how to obtain an optimal "division of labour" between training and further training.

These questions are still of major importance and must still be repeatedly answered. However, in the German Democratic Republic (GDR), this discussion was considerably widened as of the start of the 1980's. The question of complementarity and of diversification are now considered with respect to numerous political, social, economic, and individual conditions and interests.

The "complementarity" of educational processes and of their elements and phases refer, in particular, to the following:

— the motivations and the interests of students with respect to what they are studying;

— the qualities which well-rounded educated socialist personalities should display with respect to the socialist community, to professional and political life, to family relations, and to spare time;

— the professional knowledge and skills which graduates should possess given professional realities in a rapidly changing world;

— the values, goals, and tasks of society as a whole.

"Diversification", on the other hand, refers primarily to the following:

— the diversity of the talents and the accomplishments of students;

— the diversity of the demands made in different fields of activity and by the various applications of single disciplines (research, development, production, information, teaching, management, etc.);

— the fundamental components of individual study processes as constituting opposite poles of diversification;

— the different methods and organizational forms of studies which are particularly effective for the development of knowledge, abilities, and skills as well as valuable personal qualities and behaviour patterns;

— the contradictions inherent in the processes of differentiation and integration in science.

The consideration of all these relationships involves a large number of political, social, scientific, methodological, organizational, and financial questions. To deal with the problem of diversification and complementarity of higher education, the Minister of Higher and Technical Education, of the GDR defined its conception as follows: "A stable ideological, political, and moral basis, a solid basic education, a high measure of independence and scientific efficiency (on the part) of... students as well as a style of teaching and studying that leaves enough space for a differentiated and flexible approach to new developments and to the individual talents and interests of the students — this is the conception of (higher) education that has to be accomplished and shaped... (Böhme, p. 230).

This conception emphasizes the following tasks:

a) *To bring about changes in the contents of general education:* In the last few years, discussions relative to complementarity and to diversification in general education at the level of higher education have been particularly linked to questions relative to the aims and the contents of general education, the latter being raised as a result of certain global questions touching upon the very existence of mankind. University graduates, whatever their branches of study, bear an enormous responsibility for the safeguarding of peace, for the mastery of scientific and technological progress including its impact on society, for the elaboration of a just international economic system for the protection and the development of the environment, for the safeguarding of the health and the dignity of mankind, and for the solution of other problems requiring the close co-operation of all countries and peoples. Graduates in all disciplines thus need a profound knowledge of the social sciences in order to recognize the nature of such problems and their economic, ideological, political, and historical origins. But simply explaining the origins of all these problems is not sufficient in itself; graduates will also be required to contribute to their solution through their professional activities.

In the GDR, a student's education in the social sciences is based upon the theories of Marxism-Leninism, the integral aspects of which enable him to co-operate with people of divergent views for the solution of burning global problems and to identify and to consolidate the coalition of common sense. Such an interpenetration between professional education and social science is an important aspect of the development of complementarity and diversification. As a consequence, the curricula of basic studies in Marxism-Leninism were revised a year ago. The universities and the colleges of the GDR are presently involved in the conceptional work required to put the revised curricula into practice with due consideration of the professional profiles of the individual universities, of their departments, and of the different levels of instruction offered.

b) *To assure a basic education component in all phases of study:* The task of achieving an optimal balance between general education, vocational training, and further training requires that special attention be devoted to providing engineers with basic education in mathematics, the natural sciences, and technology. There are two major reasons for emphasizing the educational needs of this occupational category:

i. Development is taking place with great rapidity in technology and in the technical sciences. The innovation cycles of certain branches of industry are said to be shorter than the length of time needed to train an engineer. Given these conditions, a basic knowledge of mathematics, natural sciences, and technology will be the most stable elements making up an engineer's intellectual stock-in-trade. The life-long learning capacity of an engineer depends on the solidity and the depth of such knowledge.

ii. High technologies such as microelectronics, optoelectronics, sensor technology, laser technology, and biotechnology are rightly considered to be the technological realizations of the natural sciences. Therefore, a profound knowledge of mathematics and of the natural sciences is the prerequisite for the development and the application of high-level technologies.

Given the aims of complementarity and of diversification, selecting the specific educational contents of basic knowledge and elaborating appropriate teaching methods are very difficult tasks because of the following contradictions:

i. Mathematical and scientific knowledge will only be efficiently useful and applicable if the disciplines concerned are conceived of as a single system of interdependent facts, laws, and methods. The enormous growth of new scientific findings in the last decades cannot be mastered by an extension of training.

ii. The systematic way in which basic fields are taught tends to prevent students from developing an appreciation of the importance of the latter for their professional work and of the possibilities of their application. Students will be particularly unmotivated to study these disciplines if the curricula in which they are taught concentrate on them too heavily.

In order to make progress in the development of teaching methods for basic education courses, the Technical Universities of Dresden, of Karl-Marx-Stadt, and of Magdeburg were charged with the task of elaborating and of testing new methods of basic education. The results of these experiments having been evaluated and generalized, the following curricular structure has been suggested:

Basic education and specialized training should be outlined together by competent bodies and laid down in given study programmes. The programmes in question should provide for the teaching of individual disciplines as parts of interdisciplinary teaching and problem complexes. The latter should require for their solution both basic knowledge and the latest findings resulting from basic research. Thus basic, technical, and specialized education are associated with the possibilities for efficient diversification and reinforced individualization.

So far, it has only been possible to prepare syllabi according to the above-presented model for a few of the technical disciplines. Much still remains to be done in order to work out the theoretical bases for selecting educational contents. The task is one that could be facilitated by international co-operation of the kind that currently links the Central Institute of Higher Education to its Polish counterpart.

2. Conditions, Organizational Forms, and Methods for Individualizing the Study Process

Given the socialist principles underlying the government and the economic and education systems of the GDR; given the fact that all young people

are the recipients of ten-year polytechnical school basic education and receive vocational training as well, diversification in higher education has become increasingly a question of the promotion of individual talents, gifts, and creative abilities. The principal concern here is for the all-around development of the efficiency of the individual in the interests both of the latter and of society as a whole.

On the one hand, it is necessary to stimulate the initiative and the independence of students and to direct them to areas of particular social need; on the other hand, there is a need to create the social and economic conditions and the organizational forms and methods of study leading to the full deployment of individual talents and interests.

Other ways in which study processes have been individualized are as follows:

a) One year before graduation, each student, as determined by his qualifications, can conclude an employment contract. He thus can familiarize himself with his future workplace and even his future colleagues. He can choose his subjects of specialization and the theme of his final paper in such a way as to fully stress his interests and aptitudes while taking the requirements of his future employment into account. Such complementarity and diversification not only require flexible planning but, in fact, because of the socialist orientation of the GDR, guarantee full employment.

b) So-called research studies, aimed at promoting outstanding students who have proved their commitment and qualifications for scientific work, were introduced at the end of the 1960's. Students who meet the qualifications leave their regular programmes near the end of the third year and enroll in individual study programmes guided by senior scholars. The students in question prepare their first doctorates (e.g. Dr. Phil., Dr. ing., Dr. rer. nat.), generally completing them much more rapidly than those students who follow the normal path.

c) Some years ago, academic year activity schedules were reconcentrated. Traditional teaching activities (lectures, exercises, seminars, examinations) are all scheduled during the first 30 weeks. The remaining time available (apart from the seven week holiday period) is used for independent scientific work. In co-operation with the youth organization, enterprises, institutes, and local authorities, universities and colleges prepare a broad offering of tasks to be accomplished, and the senior scholars refer students to interesting themes including gaps in knowledge. Thus, continuous periods of time are available for scientific work. These can be used independently according to individual interests, conditions, and personal challenges.

These innovations have all contributed to the implementation of a special methodological feature of modern studies: the linking of learning with individual scientific work based on the principle of increased demand. As early as their first academic year, students are given the chance to take part in the scientific work of the various chairs.

Outstanding results can be obtained when students are motivated by the usefulness of their work. The range of problems in which students are involved runs the gamut from the design of scientific instruments for their institutions to the solution of technical and social problems arising from the introduction of new technologies. The organizational forms given to the solution of these problems range from individual work through participation in

so-called student's engineering and rationalization departments to involvement in interdisciplinary research teams. Complementarity and diversification, with reference to the needs, interests, and special aptitudes of individual students, are achieved in the same proportion as studies succeed in becoming productive phases in the lives of young professionals.

3. Efficient Links between Training and Further Training

Complementarity and diversification are important goals for the development of efficient relations between training and further training. In the GDR, two goals of this process must be stressed:

a) Creation of an intellectual potential, particularly with regard to the economy, but also with regard to the other institutions of the country, including those having to do with culture. Of particular importance here are the educational conditions necessary for the development and the application of high technologies and for the encouragement of innovation and the most efficient utilization of all resources. Therefore, enterprises, and institutions must not only be supplied with well-trained graduates but be able to arrange for the further training of their already employed experts. Therefore the universities and the colleges of the GDR must be able to give further training as much importance as they give to initial training and to research.

b). Good coordination between initial training and further training in the whole course of an individual's productive life. Here one must bear in mind that further training takes place primarily at one's place of work and is complemented by independent study and reinforced by numerous activities undertaken by enterprises and institutions, academic societies, social organizations, and colleges.

As to the division of labour between training and further training, let us examine the problem from the point of view of the training and the employment of engineers.

Experience has demonstrated that novice engineers become efficient rapidly in only a relatively small number of activities and functions which are known collectively as "Ingenieur-Grundfunktionen" (basic engineer functions). The fact that other functions, which are more complex and specialized and entail a higher level of responsibility, can only be carried out by engineers with several years of profesisonal experience determines the goals and the contents of further training.

But a complicated problem is arising. The different functions, the required activities, and the demands for qualifications are derived from the current level of technology and the division of labour. Although there have been many well-founded forecasts of the future development of science and technology, they have not really clarified the impact of future developments on the character of work and on the differentiation and the integration of activities and functions in the working process. Yet such clarification is very much needed and requires improvement in the theoretical and methodical bases for the definition and the selection of educational contents compatible with future demands. Here too international co-operation might be very useful.

With regard to the division of labour and to the need for co-operation between colleges and other actors as part of the further training process, colleges can exploit a wide range of possibilities derived from the following:

— the interdisciplinarity of their scientific potential;
— their concentration on basic research problems and their applications;
— their capacity to grant pedagogical qualifications to scientists.

As the expanding demand for further training has pushed colleges to concentrate on their specific possibilities, they have tended to link their further training offerings to their research activities and to diversify the contents of the courses they offer.

The following are some of the results:

— the concentration of the further training offerings on the development and the application of high technologies through the exploitation of the latest research findings;
— an increased proportion of interdisciplinary course offerings;
— the differentiation of contents according to the different needs of special target groups;
— a modular structure for related groups of course offerings permitting participants to have a variety of possibilities;
— special emphasis on training by means of application;
— an increased number of individually shaped courses involving the temporary employment, as adjunct faculty members, of experts from enterprises and other institutions involved in research.

4. Reform of the Training and of the Further Training of Engineers and Economists

The training and the further training of engineers and economists is on the verge of being reformed so as to adapt it to the demands of the future while retaining some positive traditions.

One major aspect of this reform is that these two professional groups will no longer be trained according to the two-level system, at university level institutions and at non-university level technical colleges. Instead, the technical colleges will train two new professional groups: technicians and junior economists, the levels of their training programmes being situated between the training level of skilled workers and university level training.

The university training of engineers and economists at higher education establishments will be differentiated according to two basic profiles. The first of these will be determined by the needs of research and development activities. The second profile will be determined by the demands of the application of science to management, organization, and the control of production.

The number of basic disciplines required for each profile will be reduced so as to favour the kind of broad basic education suitable for producing experts who are very flexible from the professional point of view.

The need both to adapt the contents of study programmes to modern challenges and to differentiate them according to different types of activities has opened new directions for the differentiation and the integration of higher education. This same need has led to reductions in the number of disciplines taught and the simultaneous differentiation of those remaining so as to form basic profiles which vary according to the kinds of scientific work to which they lead.

5. Development of University-Industry Co-operation

A task of primary importance for higher education policy, for science policy as a whole, and for economic policy is to closely integrate science, education, and production through efficient co-operation between universities and industry ("Beschluss" and "Verordnung").

Such co-operation has existed for decades, but now, in addition to extending and deepening it, measures must be taken to improve its practical utilization in the economy as well as its speed and range of application. Consequently, the contractual provisions of this co-operation have been set by law, particularly with regard to the rights and the duties of the parties concerned, the forms of contracts, and the financial and material bases of co-operation. In the meantime, about 170 so-called coordination contracts have been concluded between universities, on the one hand, and industrial combines and local authorities, on the other. Although these contracts have focussed on co-operative research products, some of them have also been directed at the need to identify the necessary educational advances to be attained both by research and by the transfer and the application of the results of scientific research.

Such coordination contracts have been used to accomplish the following tasks:

— the preparation of young skilled workers for university studies;

— the provision of employment for trainees in enterprises and the joint definition of the themes of practical courses, diploma papers, and doctoral theses that are of common interest;

— the assignment of tasks to student groups and their supervision during periods when no lectures are being given;

— the offering of special upper level lectures;

— the exchange of experts in special fields of research and of teaching;

— the joint construction of research and teaching laboratories;

— the identification of principal fields of further training and mutual assistance in the organization of courses dealing with them.

Experience has shown that close university-industry co-operation opens up new possibilities for the optimal shaping of study processes with special regard to their complementarity and to their diversification.

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ENHANCING EMPLOYMENT PROSPECTS BY DIVERSIFICATION AT POSTGRADUATE LEVEL

Colm Ó hEOCHA

In recent decades, employers have increasingly been viewing graduates as an essential resource in their enterprises. Thus, for example, in 1950 30 % of the U.S. workforce had only elementary school educations, while 19% had university educations. In 1987, the percentage of the workforce with only elementary schooling had dropped fivefold, to 6%, while that with university education had more than doubled, to 40%. Similar figures, pointing to a very positive relationship between higher education and employment opportunities, no doubt apply in most countries. Certainly in Ireland the employment performance of those with degrees is generally superior to those who leave school after second level, or with sub-degree awards.

If the university curriculum at the undergraduate level is up-to-date in its content of knowledge and is intellectually stimulating, it provides an excellent basis on which graduates can build for their own betterment and for that of society. This principle generally holds true regardless of the discipline or disciplines covered by the curriculum.

This point was illustrated recently by the president of a commercial company who was writing about the suitability of liberal arts graduates in business: "What is most needed in management today is the ability to think independently and creatively; to function in an imperfect, changing, and ambiguous environment; to make decisions when all the data required to solve the problem are not available; to negotiate and compromise; to be risk-seeking and entrepreneurial, not relying on quantitative and analytical data; to recognize short- and long-term implications; to avoid the obvious and solely subjective; to develop effective working relations with peers; to motivate people and to resolve conflicts; and to establish effective informational networks. These are all abilities fostered by the liberal arts". However, in spite of all these abilities, liberal arts graduates in many countries, Ireland included, have difficulties in obtaining immediate employment after graduation.

The problem, I suggest, lies not in the curriculum followed by such graduates, but within a society which still recognizes that a liberal education has an intrinsic value, while having difficulty in capitalizing on this resource. It is a resource that is particularly suited to the rapidly growing service industries, a sector which is creating most of the new employment at this moment. Thus in the United States, 67% of the workforce is employed in services, a figure which is 10% or more greater than that applying in most European countries. The European figure will probably increase in the next few years.

International studies indicate that the immediate employment prospects for graduates with general education are improved when employers provide on-the-job training. Thus, according to a survey conducted in Japan, in June of 1987, covering over 14 000 humanities graduates, the most popular company was Nippon Telegraph and Telephone Corporation (NTT). The survey report continues: "while NTT stands as the top choice, securities firms and life insurance companies also gained in popularity among humanities students. Seventeen of the 30 most popular firms among humanities students were in the financial sector, compared with 13 last year".

However, in many countries employers cannot afford to provide extensive on-the-job training. And, while chief executives, many of them humanities graduates themselves, may have goodwill toward graduates with broad, non-professional backgrounds, personnel managers who do the recruiting are more concerned to employ graduates who are immediately useful so that deadlines set by top management can be met. Job descriptions often preclude broad-based graduates in the liberal arts and sciences from even having interviews.

Most postgraduate education available to my generation was research-based. A student was given a research project to undertake under the supervision of a faculty member, and in due course he produced a thesis which was submitted for the award of a Master's or a Doctor's degree. In some countries, the student also had to undertake coursework, much of it an extension of that taken at the undergraduate level. This approach to postgraduate education still continues, and rightly so; its products will be the leading researchers of the future.

In recent times, however, postgraduate education has become more diversified. The aim in many countries is to develop courses which provide a professional "top" to basic degrees, particularly those in the humanities and the sciences. Many such courses incorporate a period of hands-on experience gained in the workplace.

In Ireland, the oldest such course is the Higher Diploma in Education, which is designed to train graduates for careers in second-level teaching. Conventionally, most graduates in the humanities and many in the sciences and in business studies took the course, it serving as an "insurance policy" for a job for many who might not have vocations to be teachers.

This is the background against which I should like to illustrate the diversification of postgraduate course offerings by referring to some developments at the University College of Galway during the last few years. In order to support this diversification, consultancy by academic staff in industry, the professions, public service, etc., is encouraged. Such experience brings the staff into contact with urgent "real world" problems, and the knowledge gained, in turn, makes their teaching more relevant and interesting.

Diversified Courses

In order to provide a choice for graduates in the humanities and the sciences, a diploma in commerce was introduced. Its aim is to provide an orientation for such graduates towards the commercial and the industrial environment and to give them training in the fundamental skills of business administration and marketing. Humanities graduates who also hold this diploma find it easier to get interviews and, thereby, have an opportunity

to show off their wares; significantly, their employment levels in industry have improved in recent years.

Diploma courses are also offered in specific areas of interest to graduates oriented toward employment in a commercial environment. These courses include systems analysis, quality assurance, and applied electronics. Demand for such courses continues to grow, much of it from people in employment who wish to upgrade their skills.

In line with worldwide trends, the demand in Ireland for a variety of adult education programmes is on the increase. A result has been the duplication of some undergraduate degree courses in the evenings. By these means, working adults who want a "second chance" to take a degree in the humanities, in business studies, or in law are accommodated. Non-degree courses for adults are also increasing in popularity in areas such as Health Education, Community Development, and Industrial Relations. These and other extramural courses are provided by the staff in centres of population of up to two hundred kilometers from Galway. The demand for such courses is expected to continue increasing along with the need to foster the special skills required to provide them. In order to give graduates expertise in adult and continuing education, a new diploma course in that area has been introduced.

An attractive course for many in employment is that leading to the degree of Master of Business Administration. Its objective is to prepare qualified and experienced people for wider responsibilities in the field of management and administration. Good management is identified as an essential input to economic growth and thus to increasing employment. The track record in business of many of those who have taken this course is very encouraging.

In our experience, industrial growth is greatest in small and medium-sized enterprises based on high technologies. The backgrounds of the entrepreneurs who establish such industries today differ greatly from those of two decades ago. Those who established industries in the past were, in the main, not graduates but clever inventors who often worked with their hands. Today's most successful entrepreneurs are people with degrees in professional and technical areas, such as engineering and computer science. However, their main concern is with production. Graduates in management have an important complementary function in advising high technology companies on the marketing, finance, and quality control of their products. Experience gained in Ireland confirms earlier studies undertaken in the United States, Japan, and the Federal Republic of Germany to the effect that graduate-managed small firms are more innovative, grow faster, and employ more people than non-graduate managed firms.

The rapid growth of computer technology in the last two decades and the dramatic increases in raw processing power offer users increasingly sophisticated systems. However, many potential users of this technology are overwhelmed by it. They cannot afford the learning time necessary to make effective use of it.

Up until now, computers have been used to deal with relatively well-defined sub-problems within organizations, for example, word processing, engineering design, accounting, and stock control. Henceforth, the availability of cheap processing power and networked computer power, together with software developments such as fourth generation languages, database technology, advanced graphics capabilities, and 'reasoning' tools based on artificial intelligence permit the addressing of larger problems. Whereas pre-

viously the computer undertook elements of the user-organization's tasks, it is now capable of taking a larger, holistic view of a user's and an organization's needs.

If today's computer technology is to have a benign effect on an organization into which it is introduced, it is essential to develop a methodology which, on the one hand, enables the organization to articulate clearly its goals and the means of their attainment, and, on the other, to create and implement appropriate organizational structures and work systems to ensure the desired result. On the other hand, suppliers of computers must develop means of understanding users' needs and requirements and to respond to them with appropriate technology. Thus, we are entering an era of "user pull", as distinct from "technology push". Developers and suppliers of computer technology must understand the true nature of users' requirements, the complete potential impact of the technology on the user, and they must produce a solution which fully addresses these issues. Such a solution will require an understanding of the technology itself as well as the nature of the user-organization.

These developments pose a challenge to education institutions which must contribute to the consequential manpower requirements of the communities they serve. As *The Economist* (July 12, 1986) concluded, following an extensive review of developments in information technology: "Mastering such complexity (that of the world created by automation) requires increasingly large doses of education to be mixed with the instincts and skills needed for business success. Education will be the next century's most important service industry, its costs covered by the power given to trained minds by the machines they use and create. Without such investments in people, machines will be wasted".

The University of Galway has identified the challenge which will be posed by generations of computers yet unborn. A multidisciplinary group of academic staff members has been established to advise, in cooperation with relevant representatives from industry, as to how it should respond. The group includes faculty members with backgrounds in such areas as computer science, industrial engineering, cybernetics, organization science, industrial sociology, management information and decision systems, psychology, philosophy, business studies, and business law. It is my hope that out of a synthesis of insights and ideas of the members of the group will emerge the curriculum for a postgraduate course which will help meet some of the myriad needs of society for information technology in the 1990's and beyond.

But, although employment in industry has been growing rapidly in Ireland in recent decades, a high proportion of the population still lives in the countryside. While advice is traditionally available to farmers from graduates in agricultural science and veterinary medicine, there are many social and economic problems which are peculiar to rural communities. To meet the needs of graduates in public agencies or in cooperative enterprises who are giving leadership to these communities, the University College of Galway instituted a course two years ago for the new degree of Master of Rural Development. Graduates who wish to improve the effectiveness of their work in their fields claim to have benefited greatly from courses in such subjects as the multifaceted nature of the development process: legal aspects, cooperatives, community development, enterprise management, and environmental protection. This programme has the support of the European Community. A visit to relevant institutions of the Community in Brussels is built into the curriculum.

Not all science graduates wish to proceed, nowadays, to research degrees. To meet their needs, the University of Galway has designed postgraduate diploma and degree courses which prepare them for jobs in specific industries which are developing in Ireland. The curricula provide for periods to be spent within industry during these courses.

The applied geophysics course prepares graduates for employment in gas, oil, and mineral exploration. Fish farming is growing rapidly on the west coast of Ireland; so, the University College of Galway responded to the needs of the industry for expertise by providing postgraduate courses in aquaculture. The needs of the traditional fishing industry are intended to be met by means of a new course in fisheries technology which we have developed jointly with the Aalborg University Centre in Denmark. A multidisciplinary Master's degree programme in biotechnology has attracted many of Ireland's best graduates in the biological sciences who, after completion of the course, are keenly sought by the food and pharmaceutical industries. We have a large postgraduate programme in hydrology which was established some years ago with the prime aim of providing expertise to graduates from developing countries. Students undertake projects in their home countries as part of the course, and they are expected to apply their knowledge of the management of water resources when they return home. This diversification within the Engineering School was made possible by support from Ireland's Foreign Aid Programme. The new Master's degree programme in Medical Science is also attended by graduates from developing countries who wish to deepen their knowledge of the area of medicine in which they are practicing.

Other Diversifications

Universities can help students gain employment after graduation by means other than formal courses. One very successful example is based on the recently established Department of Marketing of the University College of Galway. The primary objective of the programme is to train and to develop future marketing executives through practical on-the-job experience combined with appropriate coursework. This objective is achieved by placing graduate trainees in firms which can utilize their particular skills and which offer potential for employment on completion of the nine-month programme. A second objective is to provide an input to companies which will strengthen the marketing function in the firms and thereby develop new markets and create new jobs. This programme has resulted in the creation of marketing jobs in many companies in which none existed before. It is estimated that new markets worth 3 million pounds to participating companies have been developed in the five years in which the programme has been running. All the graduates who participated in this initiative have jobs, many in companies in which they had been placed as marketing executive trainees.

Another approach to employment creation is the establishment of a campus-linked complex of incubator units in which ideas for new products and processes can be tested before being launched commercially. Such a Centre at Galway has been working for about five years. Potential entrepreneurs benefit, while developing their projects, from access to the skills, equipment, and information facilities available on the campus. This aspect is a prime criterion for selection of occupants for the centre. The intention was that the new nursery facility would help and encourage the commercial exploitation

of ideas emerging in the course of academic research and provide employment opportunities for graduates. The hope has also been that it would serve to encourage young graduates to consider the possibility of generating their own employment by becoming involved in starting a new company at an early stage. It was also intended that the Centre should influence the economic development of the region by providing an additional mechanism whereby technology imported into the area through the agency of larger multinational companies would spin off and take root through the establishment of new small indigenous technological industries.

The Centre consists of a 600 square meter building divided into eight independent units. Plans have now been drawn up for expansion. Each unit is provided with a telephone, three-phase power, and water supply. Services such as facsimile transmission, telex, photocopying, restaurant services, and meeting facilities within the College are made available to client companies. Tenants are offered leases for a maximum period of two years beyond which successful ventures may move to nearby industrial estates or to a new International Services Park which is being established on the campus at the moment. Unsuccessful ventures are terminated. The Centre is managed by the Industrial Development Authority (IDA), but a management committee consisting of representatives of the University and of the IDA meet regularly to review the operation of the complex. Resident companies are encouraged to interact with the university and the academic staff and to utilize computer, library, and other campus facilities. The emphasis is on promoting informal linkages, but formal cooperative arrangements can be made if required.

The Centre has housed nine companies operating in such technologies as computer applications, software development, computer-aided manufacturing, biotechnology, and synthetic organic chemistry. These companies have employed more that 55 people, most of whom are graduates. One of these companies has failed, and two have developed beyond the incubator stage. One of the latter is now established in a nearby industrial estate and employs about 40 people, and the other is on the point of leaving the complex. Recently a research subsidiary of a multinational company has been accommodated in the complex, as has a new Business Innovation Centre, which is being developed with assistance from the European Community to provide additional support services by supplying suitable training input and advice on business planning, marketing, and management skills to other small companies in the complex and elsewhere in the Galway region. Additional funds amounting to 610,000 ECUS have just been allocated by the EEC for this venture for the next three years.

Conclusion

Job creation is a major social objective in Ireland. More than 50% of the population is under 25 years of age, and the outward mobility of young people is on the increase, particularly to other northern countries of the European Community and to North America. That initiatives taken at the university level, combined with those of others in the public and private sectors, are bearing some fruit is attested to by the fact that unemployment in the Galway region stands at about 11% as compared to 19% nationally. Indeed, some managers complain of a lack of suitably qualified people needed for the expansion of their enterprises.

REMARKS ON THE DIFFERENTIATION OF HIGHER EDUCATION, PARTICULARLY DURING THE FIRST CYCLE

Louis LÉVY-GARBOUA

The expansion of any market is determined, sooner or later, by the differentiation of products and by their change. No single and unchanging product can be equally suitable for all uses and all tastes at all times.

In order to go beyond the obvious limits of such a market and to allow for its further expansion, producers must meet the diversified demands of consumers by offering them a range of differentiated products. The "industry" of higher education makes no exception to this rule. In industrialized countries, it must satisfy the new and diversified educational demands that technological change, the division of labour, and the heterogeneity of skills and of motivations have been arousing at an unprecedented rhythm. The massification of education and its differentiation go hand in hand.

In France, this movement has been under way now for nearly twenty years, as demonstrated by the creation of the DEA *(diplôme d'études approfondies* — diploma of specialized studies), the DESS *(diplôme d'études supérieures spécialisées* — diploma of advanced specialized studies), the *Mastère* (a kind of Master's degree), the third cycle university doctorate and the doctorate in engineering, the MST (a kind of Master's degree in science and technology), and the *Magistères* (advanced Master's degree), in addition to the traditional *Licences* and *Maîtrises* and to the second cycle training of the Grandes Écoles; the spectacular if insufficient development of the first cycle level IUT's (University Technological Institutes) and BST *(Brevet de technicien supérieur);* as well as the setting up of a constellation of small schools still little known to the public at large; and the introduction of new university disciplines such as management, economic and social administration, applied foreign languages, informatics, etc.

These examples illustrate the fact that the diversification of courses of study takes place horizontally and vertically. *Horizontal diversification* finds its expression in a larger choice of disciplines and specialities offered to students at a given level. *Vertical diversification,* on the other hand, consists in the extension of the range of different levels at which access in any discipline or speciality is possible.

Compared to foreign experiences, the French higher education system is clearly distinguished by its *poor vertical diversification.* The origins of this peculiarity are easy to explain: the main task of the original faculties was to secure the nation's scientific and cultural reproduction (teachers, researchers, etc.) and the training of members of the liberal professions (lawyers, physicians, etc.). The Grandes Écoles were entrusted with responsibility for the

renewal of highly qualified specialists for industry and the administration (engineers, executives, managers.). *The "final products" delivered by these two types of institutions were obviously trained to second and third cycle level, the large battalions of first cycle students, in universities as well as in the CPGE's* [1], *only existing in order to supply the upper storeys.* In this structure, almost no first cycle terminal diplomas existed. Persons entering employment at this level were recruited from the pool of dropouts as well as from the pool of better qualified secondary education graduates *(bacheliers de l'enseignement général).*

Although these times are long past, the structure of the system has remained almost the same. All of the new first cycle diplomas (the DUT, the BTS, the diplomas of the paramedical, the social sectors, and the small schools) were grafted onto the periphery of the system, without affecting its centre. The inertia of this centre has slowed down vertical diversification.

The main hindrance to the vertical diversification of higher education is, in my opinion, the institution of the DEUG (diplôme d'études universitaires générales), the diploma which marks the completion of first cycle general university studies. Indeed, the peculiarity of this diploma is that it grants an automatic right of entry into the second general cycle of the universities; a *terminal diploma,* on the other hand, such as the DUT or the BTS[2] marks the end of a cycle of studies without necessarily giving access to the next cycle. One useful result of this situation is that institutions which deliver terminal diplomas are strongly prompted to provide self-sufficient training recognized by employers. Students who wish to continue their studies are induced to acquire the necessary capacity to do so. The attraction exerted by the BTS's and the DUT's on increasing numbers of secondary school leavers, in spite of this disadvantage, is proof of the fact that there is a demand for self-sufficient first cycle training. *By opening up automatic access to the second cycle, the DEUG fails to fulfill its function as a terminal diploma,* a fact proved long ago by means of statistical evidence. Thus, universities are not motivated to provide their students with first cycle training which is self-sufficient on the labour market, nor are students motivated to graduate at this level or at least to make an effort to profitably pursue second cycle training worthy of its name. Moreover, the DEUG hinders the spontaneous development of first cycle forms of training sanctioned by a genuine terminal diploma by giving secondary school leavers certain perverse impression that they can win on both fronts, that is, obtain a first cycle diploma and have improved chances of acceding to the second cycle[3].

Therefore, in order to achieve a harmonious vertical diversification of higher education, the DEUG should be replaced by a terminal diploma marking the end of first cycle university training. Its consequence would be the *marked separation of the first and of the second cycles,* a separation which frequently exists in other countries, to the general satisfaction of everyone.

Separating the two cycles can be of real service to both of them. What we presently lack is management by objectives. The first cycles should concern themselves with the employment prospects of their graduates as well as with the chances of admission to the second cycle of those of their graduates who wish to apply. The second cycles would be particularly careful to remain attractive and to be able to place their graduates into good positions.

Each university, measuring its strength, could define a strategy of its own calling for it to excel either in the first cycle, or in second and third

cycles, or in all of them at the same time. The separation of the two cycles would result in the restoration, within each of them, of loyal, socially profitable competition among all the possibilities of training offered. Confronted with the need to attract students, the university departments of the second and third cycles would pay more heed to differentiating themselves in order to exploit their advantages and to excel in their specialities. Thus a new impetus would be given to horizontal diversification which is nowadays absolutely necessary. Deprived of the privilege of granting their students automatic access to the second cycle, the university departments of the first cycle would have to choose their strategies with care in order to remain attractive. Some would place their bets on professional training, others would aim at good preparation for the second cycle; while still others, better equipped, would pursue both aims [4].

The benefits to society as well as to the state budget of such a reorganization of university education would undoubtedly be significant [5]. A less heavy and more efficient management of the various departments would lead to a *more rational use of human and material resources.* There would no longer be any harm, for instance, in entrusting a major part of the first cycle teaching to teachers who are not researchers and whose professional qualities would have other means of expression than academic research. It is perhaps even more important to underline the enormous sources of waste in terms of human resources, such as the following, which proper orientation of students and of candidates could help to avoid:

— *the absorption of too many good graduates of general lycées by the first cycle technical training programmes (IUT, BTS) and, at the same time, the sending of too many mediocre graduates of technical lycées into general study courses in the universities;*

— *the diversion of too many good pupils* who, instead of enrolling in courses which interest them, chose paths which do not involve risks, while attesting to their worth;

— *the quasi-closing of higher education to people with professional experience* who wish, in one or two years, to acquire complementary training at first or second cycle level;

— *selection by excessive dropout during the first university cycles*, the cause of which is that a large fraction of the enrollees require first cycle terminal training but are only offered second cycle terminal training [6].

The implementation of this reform requires several measures:

— *the elimination of the DEUG*, within a reasonable period of time, during which the universities could create a terminal first cycle course of study of a vocational or a general type, and define their strategies at the level of the second cycle;

— *the creation, if necessary, of first cycle colleges*, not affiliated with the existing universities. These could be created upon the demands of local communities which would then ensure their financing and which could directly recruit their teaching staffs (maybe from the reserves of secondary and higher education). It would not be possible to transform these colleges into universities;

— *a large autonomy*, both pedagogical and financial, of university institutions, without which their diversification would be illusory;

— *increased resources*, justified by the overall improvement of the quality of training and the professionalization of certain fields. Such increases, however,

would have to be kept within acceptable limits due to the substantial savings expected. A part of these resources could come from the local communities (cf. the case of colleges). Payment of non-symbolic enrollment fees could also be required of students if the latter could easily cover them by means of "summer work" (at that point, appropriate fiscal incentives could be foreseen for them and their families). Finally, enterprises might contribute to these resources if they were convinced that improved training of students at a university would save them the costs of in-service training (for instance, part of the tax paid by the employers in the form of family allocations could be compensated by introducing a new tax for training; universities, on which most of the reorganization effort relies, should be the main beneficiaries of the funds raised in this manner).

NOTES

1. "Classes préparatoires aux Grandes Écoles" (preparatory classes for the Grandes Écoles).
2. DUT — "diplôme universitaire de technologie" (university diploma of technology). BTS — "brevet de technicien supérieur" (certificate of advanced technology).
3. This is the argument of Boudon, Cibois and Lagneau (1975) explaining the "relative failure" of the IUT's in terms of enrollments. Now it seems that it is too strong to speak of "failure". But it is perfectly true that without the DEUG the expansion of the IUT's and the BTS's would have been much more rapid.
4. In this case, students would have probably been attracted, at the end of the first year, towards a second year of vocational training (to the present DEUST) or to more substantive general training preparing them for entry into the second cycle.
5. The conclusions of this paragraph, in particular, are broadly the same as those of the 1987 report of the National Evaluation Committee, pp. 63-65.
6. As I have shown elsewhere (Lévy-Garboua, 1986), the organization of an open system (one without selection at entry into the second cycle) which results from this undifferentiation of the "products" of the University has, in its turn, perverse effects on the motivation of the students and on the efficiency of the institutions, which only increase selection by failure.

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THE VOCATIONAL TRAINING OF STUDENTS AIDED BY TEACHING-RESEARCH-PRODUCTION ASSOCIATIONS

V. A. GAISYONOK

The programmatic task of accelerating the socio-economic development of the USSR, put forward at the XXVII Congress of the Communist Party of the Soviet Union (CPSU), calls for the radical improvement of specialist training as well as for the restructuring of higher education throughout the country. The "Principal Directions for the Restructuring of Higher and Specialized Secondary Education throughout the Country" and the related decisions adopted by the Central Committee (CC) of the CPSU and by the Soviet government stress those issues which are linked to the improvement of the content of education and those teaching forms and methods which ensure that the training offered will form specialists having broad profiles which combine both practical and in-depth fundamental knowledge. As specialists are confronted with a process of rapid obsolescence and renewal of knowledge, with changing technologies, and with the need to constantly reequip production technologies, they must not only have been the recipients of adequate professional training but must be professionally mobile and capable of looking ahead so as to orient themselves with regard to the constantly expanding quantities of scientific, technical, social, and political information that will be made available to them, and be capable of lifelong retraining in their professional fields.

At present, Soviet higher education is unable to completely fulfill this task. The emphasis on quantity, characteristic of the economy as a whole, has been introduced into the field of higher education. While the number of specialists has been constantly increasing, it has not been matched by improvements in the quality of training. University graduates who have received broad general instruction in all disciplines have more often than not found themselves unprepared to cope with the realities of concrete activities. Technical higher education institutions, which train cadres for the national economy, frequently provide only a fragmented, insufficiently encompassing education. In such conditions, the quality of specialist training often reduces itself to a question of expanding the volume of material to be taught. Thus students are overworked and, in fact, prevented from developing the skills needed for independent work and from studying areas of knowledge specifically related to their professions. At the same time, a great number of possibilities for specialization have emerged, thus leading to the deterioration of general education and to the narrowing of vocational training. Academicians Belotserkovsky and Velikhov have labelled such type of education as "extensive — informational" education.

Practical realities have stressed the need for a shift to an intensive fundamental type of education in which basic scientific subjects and practical training are blended harmoniously. The assumption is that this task will be solved by the integration of higher education with production and research. The experience accumulated by Soviet institutions of higher education testifies to the mutual advantages of such an integration. Higher education, with its powerful intellectual potential, can have a major impact on the acceleration of scientific and technical progress. At the same time, production and research offer possibilities for achieving purposeful practical training, for making dynamic changes in the content of higher education, and for broadening the uses which higher education can make of its material and technical bases.

The decision adopted by the CC of the CPSU and the Council of Ministers of the USSR, entitled "Measures Intended to Radically Improve the Quality of Training and to Assure a Better Use of Specialists with Higher Education Qualifications in the National Economy", stipulates that higher education institutions and enterprises may enter into contractual relationships for the training and the retraining of specialists. The concrete forms to be given to these relationships as well as the ways in which students will participate in practical activities will be elaborated according to the dictates of everyday life.

Some positive experiences in this domain can be cited, in particular, the teaching and research complexes which operate on the premises of the Moscow Institute of Physical Engineering, the Moscow N. E. Bauman Technical Institute, and on those of a number of other higher education establishments. Students participate actively in the research activities and the experimental design work carried on in these complexes.

In the Byelorussian SSR, another form of higher education-industry link, the teaching-research-production associations (known by the Russian acronym, UNPO), has proved its effectiveness. It is a form of co-operation which involves bilateral and multilateral co-operation with industrial organizations and research institutes. At present, over 50 UNPO's are operating in Byelorussia.

What in fact is a UNPO? The acronym designates a specific form of interrelationship between a higher education institution and a particular enterprise or group of enterprises or a research institute which works as follows: the enterprise takes an active part in the material support of the higher education institution in question, receiving in exchange young specialists as well as practical ideas and information as to decisions taken as the result of research. The co-operation involved which touches upon the educational work, the production, and the research being undertaken by both parties brings instruction and production together. Students are thus involved in the solution of concrete research and production tasks, their practical training is improved, and the production and research facilities of the respective enterprises take on a pedagogical dimension. At the same time, the specialists employed by the given enterprise are offered the chance to play an active part in instructional-educational activities, while the research and academic staff members of the higher education institution concerned participate in the resolution of current research and production problems and in the retraining of the personnel of the enterprise.

Although UNPO's carry on many specific kinds of activities, this article focuses primarily on issues related to the vocational training of students in these associations, with direct reference to the Faculty of Physics of the Byelo-

russian V. I. Lenin State University, headed by the author. This faculty has UNPO links with various institutes of physics attached to the Academy of Sciences of the Byelorussian SSR and with instrument-making enterprises located in Minsk, the capital of the Republic.

A UNPO is organized on the basis of a contract which stipulates the rights and the obligations of the parties concerned and the mutual responsibilities in the fulfillment of the obligations assumed. The association is managed by a Council made up of representatives of both parties. The Council decides as to the number and the profiles of the specialists which need to be trained for the given enterprise. It determines the types of specializations required and the ways by which to ensure the rational organization of the practical training of students. It also defines the tasks of research co-operation. A UNPO is headed by the rector or the dean of the higher education institution concerned and by the director of the given enterprise. The material base of the UNPO encompasses the instructional-research and production facilities of both partners. Extensions (Branches) of various chairs, student research and production associations, as well as joint research laboratories are created within the framework of a UNPO. In the case of the UNPO's involving the Faculty of Physics of the Byelorussian V. I. Lenin State University, five of its chairs are linked to the staffs of the institutes of physics which are subordinated to the Academy of Sciences of the Byelorussian SSR and to a number of training laboratories, several student design bureaux, and two joint laboratories for conducting scientific research.

The direct training of students in production units or in research institutes is the responsibility of the branches of the given chairs which themselves were selected according to their specializations. The branches in question are subordinated to the Council of the given UNPO. The branch is headed, as a rule, by one member of the staff of the enterprise concerned.

Among the tasks to be accomplished by these branches, mention should be made of the following: elaboration of the content and the volume of the vocationally oriented disciplines; organization of the educational process according to the concrete conditions of specific activities which are aimed at helping students assimilate the necessary professional skills and aptitudes; organization of the practice and of the pedagogical activities expected to take place during practical training periods; supervision of that part of the educational process taking place directly in production units; joint research work requiring the particular involvement of students; supervision of the probationary periods of higher education graduates; the granting of assistance to the persons responsible for the probationary work of newly graduated students; coordination of the involvement of the specialists from the given enterprise in the pedagogical activities carried out by the branch; organization of training stages at production units for the teaching staff; elaboration of recommendations as to the content of retraining programmes in higher education institutions intended for specialists working in enterprises; and selection of young people to be trained for specific purposes.

The professional training of specialists by means of the facilities of UNPO's is based on the concept of continuity and includes the following stages:

— *identification and formation of the professional orientation* of the individual;

— familiarization of the individual with the content of his future career and acquisition of various professional skills;

— transition to actual professional activity at the enterprise.

The joint work involving given UNPO's with regard to the vocational training of students takes place before the latter actually begin their university studies. Partner enterprises, as a rule, sponsor so-called affiliated schools. The pupils studying in them are trained in various specialities in the sponsoring enterprises. The teaching staff of the university, including staff members working within branches of chairs, are responsible for the selection of the most talented of these pupils for preparation for admission to the university. For this purpose, schools of young physicists have been set up in academic institutions, and olympiads, organized at various levels, from the district to the republic-wide level. Various means of mass information such as radio, television, and newspapers are also used.

The identification and the moulding of professional aptitudes continue during the period that students are studying at the university. During the first two years, when basic general disciplines are taught, a number of activities are carried out which are aimed at inducing students to choose appropriate specializations. Thus first year students attend a course which is entitled "Introduction to Speciality". Much of it consists of lectures delivered by leading specialists employed at various enterprises and organizations. The students thus receive a general presentation of the areas of their possible future careers. In particular, they are briefed on the whole gamut of problems which are solved by the institutes attached to the Academy of Sciences of the Byelorussian SSR and on the tasks of science-based production in the Republic.

Other forms of practical training, such as the creation of student production and research units, have proved successful. Such a unit consists of a group of students, formed on a voluntary basis, who work during their free time in an enterprise or in a research laboratory. Starting with the fulfillment of tasks incumbent upon workers, technicians, and laboratory personnel, and followed by the execution of tasks demanding more advanced qualifications, the students acquaint themselves with the practicalities of their future profession. During the first two years of training, almost 30% of the students from the Faculty of Physics take part in the activities of these units, earning some money for the work that they do.

In addition, various scientific societies have branches at the faculty. Some of these are led by specialists from enterprises or by staff members drawn from the branches of the chairs. There are also student research associations.

At the end of the second year of study, students are divided into different groups according to specialization. Some of these groups are oriented towards research; others, towards production. At this point, the second stage of professional training begins. In addition to taking general courses, students must also take courses in specialized disciplines. Part of the latter are offered by the local staff at given enterprises. Here too students engage in various kinds of laboratory activities. It is important at this point that the concerned students display an aptitude for research.

Third and fourth year students are required to engage in teaching-research projects, an activity aimed at imparting the ability to shoulder a succession of increasingly complex responsibilities. To fulfill this requirement, students develop good working habits and research skills and gain practical experience. The tasks to be accomplished as part of the teaching-research work are established individually. A significant number of the students studying at the

Physics Faculty of the Byelorussian V. I. Lenin State University carry on such tasks in various enterprises and research institutes with the active participation of the corresponding branches or chairs.

Great importance is attached to the collective scientific and design activities carried out by students aimed at the solution of fairly complex problems. These activities take place in the student scientific research laboratories and the design bureaux. The laboratories form part of a group of research laboratories with responsibility for the accomplishment of a number of production related tasks. As such, they bring together students who are led by one or by several members of the teaching staff working within a particular branch of a given chair. Each student laboratory or bureau is assigned a concrete task involving research or development work. The undertaking of such activities helps students to better perceive the end products of their work and to develop increasing awareness of the importance of the work done.

Students are paid for the execution of given tasks. Many of them even carry on activities within the existing student research units during their holiday periods. As a rule, students in all years of study participate in the activities of given laboratories or bureaux. Graduate students supervise the activities of junior students thus gaining experience in management. Practice has demonstrated that the involvement of students in concrete types of research activities is pedagogically very effective.

The final stage of vocational training starts after students have been assigned to the places of employment where they will work upon completion of their four-year study courses and graduation. The assignments in question take into account the personal choices of the students concerned, their academic achievements, and the results which they have obtained in research. The graduates tend to adapt rapidly to their new environments as a result of the training which they received in a specific branch of production or of research.

The core of the vocational training offered is the field practice undertaken by students at their future work places. This stage is important and fairly complex. The students involved in it must solve a number of tasks which reflect and combine typical elements of their future professional activity.

Many enterprises and research institutes employ students directly at their future work places, entrusting them with the execution of a narrow range of responsibilities. However, such tasks do not really fulfill the aims of field practice as it is supposed to be, for they do not enable students to develop the complex aptitudes and skills which they will need to display in their future careers.

Experience shows, however, that the problem of proper practice training is best solved within a UNPO. With the help of the branches of given chairs, each student is assigned an individual task which he accomplishes under the supervision of specialists from industrial enterprises. Each task is designed to include elements which help students to familiarize themselves with the economic aspects of the given enterprise or research institute and with its basic tasks as well as its perspectives for development. The latter aim is achieved through a relatively short cycle of lectures which is delivered by members of the branches of given chairs during practical training stages.

While students are preparing their diploma papers, they take part in pre-diploma practical activities which include the solution of complex problems derived from the subjects of their papers. One form of pre-diploma training is the solution of a major problem by a group of pre-diploma students under

the supervision of a teaching staff member. Each year, a number of diploma papers are assimilated into production processes or are published in various research journals.

The final state examinations and the defense of diploma papers involve the active participation of the partner enterprises involved in the UNPO. They are the "users" of the final product. After graduation, students hold probationary status in their employing enterprises for a year during which they are supervised by teaching staff members from branches of the specialized chairs.

Graduates working in production units will return to the university for retraining courses, the curricula of which are established by the chairs with due consideration to the wishes and the needs of the given enterprises. Although the number of specialists from various enterprises trained at the Faculty of Physics is modest, the impact of the training is great. Not only does it raise the professional qualifications of the specialists drawn from industry, but it meets the corresponding present-day requirements of the students' training.

The organization of professional training at the Byelorussian V. I. Lenin State University strives to apply the principle of "training through practical activity". Although the use of UNPO's for such a purpose seems to be a long-term application of the principle, the resulting linkages are not free from shortcomings and problems. For example, staff members working in the branches of the various chairs may tend to expand their professional training and to neglect the basic education of their students or to narrow down their professional training to a gamut of responsibilities characteristic of a particular work place. Another problem that arises is the pedagogical training of the staff members in question. It also may happen that in a number of cases, the work carried out by the branches, while touching on issues which are linked to student training as such, will not involve problems of research co-operation within the framework of the UNPO. The result of such a situation is the creation of a gap between training on one hand and research practice on the other that will affect the quality of specialist training. A final problem, one which has not yet been solved, is the modality for co-operation between the Faculty of Physics and various enterprises for the in-service training of specialists.

The Soviet higher education system is now passing through a period of restructuring, the aim of which is to ensure the mutual interaction and the blending of higher education and creative work. The pooling of efforts on the part of teaching staff members, on the one hand, and specialists from enterprises and researchers, on the other hand, in the framework of UNPO's, is aimed at raising the quality of specialist training. Thus UNPO's represent a major step forward in the accomplishment of this important task.

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DEVELOPMENT TRENDS AND DIVERSIFICATION OF HIGHER EDUCATION

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The process of change in higher education is a difficult one which has to overcome the inertia of deep-rooted traditions and the inability of society to deal rapidly with those socio-economic problems which are generated by the accelerated development of science and technology.

The formative function of higher education has been neglected in favour of a concentration on the collection of data. In order to perform this function satisfactorily, university teaching will have to be modernized and changed decisively. In particular, higher education will have to respond to the demand that work be integrated with education. The fact that education and productive work are, so to speak, divorced has resulted in considerable losses in terms of material and human potential.

What is needed is the elaboration of a new, all-embracing university, one including the two-year schools and the academies. By its very existence, such an organization would stand for "unity in diversity" in terms both of organization and of curriculum, and it would facilitate educational mobility which would be both vertical and horizontal. For a transformation of this sort to be achieved, it would be necessary to make changes in the organization of teaching so as to enable it to take place in environments other than those provided by the departments of schools and universities. In addition, the procedures for the imparting and the acquisition of knowledge would have to be modified so as to be increasingly in conformity with the needs and the desires of employed students. Accordingly, it would be necessary to change the criteria for admission to institutions so that time spent in employment would be treated as an essential prerequisite for admission to higher education. But in order to fulfill such a condition, it would be necessary to organize work in a more flexible manner.

Universities must now combine three essential functions: initial preparation, development of new knowledge, and effective dissemination of the latter. The increasing stress being placed on the role of lifelong education is modifying conceptions of the three functions in question and of the traditional view of the organization of education systems. According to new conceptions, education systems should consist of two essential parts: basic schooling and post-school education. The latter would not be compulsory but, continuous and lifelong.

The mass media are called upon to play a major role in the modernization and the diversification of university teaching. Many possibilities for its participation exist despite resistance to it in some quarters. Certainly, mass media applications will stand to humanize education and to relieve the teacher of routine work so that he may concentrate on maintaining a dialogue with his

students that will give rise to creativity. The mass media are also in the position of being able to encourage the processes of informal study, processes which will acquire increasingly broad dimensions with the continuing implementation of lifelong education.

Education aided by mass communication is more effective if it is combined with work in small groups, with consultations, and with tutorials so as to avoid one-way communication. Experience already gained in the use of the mass media for instructional purposes must be utilized and made the basis for further advances.

In the case of the socialist-oriented societies, a need exists to re-examine the functions of socio-political organization as determining factors in education. The traditional system of education hampered the role of socio-political organizations which it viewed as external factors supporting the interests of society more-or-less to the exclusion of those of the school and of the university. According to the philosophy of lifelong education, on the other hand, socio-political organizations are called upon to act collectively as the internal motive and the cohesive force of educational institutions. The activities of such organizations can contribute to the democratization of education and to its closer integration with work.

The modernization of higher education requires the exploration of new theories of education and the re-examination of old ones. The styles and the methods of teaching and of studying must be modified so as to suit adults. Higher education had traditionally nurtured a one-sided cognitive approach leading to passive, observant attitudes on the part of students.

The battle for the modernization of higher education cannot be won without the creation of an organic link between science and teaching. In order for such a link to be forged, new knowledge gained through in-depth research of a high scientific calibre about the study possibilities and modalities of employed persons must be brought to bear.

According to the philosophy of lifelong education, a selective approach to the content of education is very important. *New knowledge* must be given priority, and a salutary balance must be struck between the knowledge which students acquire in school and that which they acquire outside of school — from the mass media — for example.

A *prognostic* dimension must be imparted to the selection of contents; that is, the contents of formal education must introduce students to future problems which they will face throughout the course of their work and their social lives.

The importance of programme design methodology in higher education must be stressed. Inductive and deductive approaches must be combined in the selection of contents and in their presentation. Consequently, the selection process must be an open one. The resulting instructional programmes need not include everything that given specialists consider to be necessary in terms of content. The integrative function of lifelong education requires the linking of all levels of education and the creation of a new but suitable programming structure. These same functions of specifically higher education require the further linking of socio/humanistic knowledge and the content of vocational education given that the elements of professional and socio-humanistic knowledge and skills are in permanent interaction. Vocational-technical education should be complemented by those wider social-humanistic aspects which will

enable individuals and social groups not only to produce with increased efficiency but also to participate with success in decision-making processes bearing upon social problems including those concerned with the sphere of labour.

The socio-humanistic contents of higher education along with subject matter drawn from other sources ought to enable man not only to live in society but to adapt himself to that society and to alter it in a creative manner.

The division between vocational and socio-humanistic elements in given higher education curricula is no longer acceptable. A question that naturally arises is who should determine what the contents of higher education should be: the professor, the students, or some combination of both? In what conditions might the student determine what the contents should be? In what conditions should the professor make the decision?

These questions offer a fitting conclusion to our essay.

III. Ways to Achieve Optimal Balance between General Education, Vocational Training, and Further Training in Higher Education

GENERAL EDUCATION, VOCATIONAL TRAINING, AND FURTHER TRAINING IN HIGHER EDUCATION: PERSONAL REMARKS

Gaston MIALARET

The theme of this meeting can be considered in depth only if placed in a perspective of time and space as it has not been stated in the same terms throughout history, and it is not viewed identically in all parts of the world. One must therefore analyze the relations between general education, vocational training, and further training in the following perspectives with a view to better understanding the concepts they involve:

— general historical perspective;
— technological development;
— pedagogical and psycho-pedagogical development;
— philosophical and social development.

Hence the following remarks which do not claim to solve the problem but are only intended to provide elements for discussion.

General Historical Perspective

It is impossible to go into detail so far as the historical aspect of the problem is concerned, for it would be necessary to go back to Plato and to retrace the history of education. We shall therefore point out only several viewpoints which were, so to say, milestones along the path of history.

From the earliest moments in history and until relatively recent times, the school (regardless of its institutional form and of its initial very elementary level), that was intended for "citizens", "clerics", "nobles", was almost completely differentiated from the system of apprenticeship training, based on learning by imitation and practice, intended for the training of artisans. On one side of the gulf there were books, learning (particularly that of the classical authors), language (particularly rhetoric) and the qualifications conferred by the emerging universities. On the other side, there was the world of real experience, of practice, of action, of everyday life. On the former side, the candidate was supposed to earn a university degree, the baccalaureate, the Master's degree, the doctorate; on the other side, he was expected to produce a "masterpiece". A student's life had its parallel in that of an apprentice-companion and of his world view.

Gradually, an institution was created on the first or "genteel" side: the school system. It was only in the 19th century that "vocational schools", the forerunners of the technological and vocational education of today, were set up. However, even then the two worlds remained apart, as was the case with those who attended them. It was obvious that the students in "colleges" and "universities" like those in the *lycées* of today were not the same as the "apprentices", the "companions", the "craftsmen". To the separateness of the curricula was added the separateness of the social backgrounds of the students themselves (a reality which has been clearly demonstrated by the educational sociologists of the last fifty years). In the first case, one spoke of "culture" (in the restrictive sense in which the word is used in French), of "general culture", of the "humanities"; in the second case, one spoke of apprenticeship, of a trade, and therefore, of vocational training. In the minds of many people, technological training does not lead to the acquisition of a technological culture but to a more-or-less organized system of directly usable knowledge; for such people, the only true culture is that which one acquires through contact with the great books (especially the Greek and Latin classics). This situation must be taken into consideration when speaking of the concepts of general education and vocational training; attitudes and stereotypes do not change in a few minutes of discussion.

In different countries the situation has evolved in different ways. In some of them, one can even observe an exceptional development of all forms of general education (including university level education), while in other countries, technological education, very much a poor cousin of the system, is barely nascent, being endowed with a minimum of funds and of staff and thus being barely able to survive. Certain countries have fortunately understood the importance of technological training and have reached a balance in the evolution and the development of the two systems of training and, even, in some cases, a harmonious synthesis of the two.

Technological Development

We are witnessing a twofold movement here, one in terms of extension, the other according to degree of technicity; the two aspects should not be confused because they have different pedagogical consequences.

The world of technology is closing in on us, it is becoming our familiar everyday world. At the beginning, the work places of craftsmen were more or less restricted as to geographical location; the same was true with regard to large-scale industry, which at the start was isolated from residential areas; however, progress has led the world of technology to practically explode into our daily lives: objects, tools, household appliances, radio, television, cars. Children, adolescents, adults live in a world which is no longer "natural" in Rousseau's sense; an ever increasing share of "nature" is being superseded by technological objects.

Here again situations differ according to location; some children living in towns have only had a very limited experience of nature; however, they have great ability in handling rather complicated technological objects. Their peers living in the countryside, on the other hand, have extended knowledge of nature (flora, fauna, the cycle of seasons, weather conditions) but are a bit puzzled

by certain gadgets with which every little inhabitant of the town is familiar. However, all these observations depend on the region and on the country as well as on the location of the region within the country in question.

Technological objects are becoming increasingly difficult to analyse, to understand, to build. Archimedes's screw, which was used to facilitate the transport of grain or of water (and which gave proof of a certain sophistication with regard to mathematics and to classical mechanics), is as much separated from the moving gantries of today which are operated with precision by electronic controls as is primitive man from our contemporaries. As technological objects are becoming increasingly easy to handle and are more and more often used in our everyday lives, the world of children and of adolescents is being transformed, and the environment itself is being increasingly composed of objects resulting from technological progress. However, these objects are less-and-less understandable with regard to the principles underlying their operation and require, in order for them to be understood, analysed, overhauled, and reassembled, a background of scientific and technological knowledge which must sometimes be fairly sophisticated; one only needs to think of a car or of a television set. If one of the functions of education is to enable the subject to understand (and to act upon) his surrounding world, it is indispensable, today, to consider technological training as an important aspect of education.

Pedagogical and Psycho-Pedagogical Development

Pedagogy is not a science frozen "ad vitam aeternam" (as some people are inclined to think !). It develops and it must be adapted to the conditions of its subjects; it cannot remain insensitive to changes in the conditions of their lives, and if one of its objectives is to prepare the subject of today to live well in the world of tomorrow (a suggestion which merits a lengthy discussion), it obviously cannot ignore technological progress and the transformations under way in the professional world. Here again we can only point out a few high points as a precise and in-depth analysis would go beyond the limits of this article.

Rabelais's reaction to a method of education overly separated from life is significant. He takes his pupil to visit artisans and has him rub shoulders with the real world; he wants him to learn how to live.

One can also note the 18th century movement (Rousseau and the Encyclopaedists) which tried to introduce professional life (then at its inception) into education; these efforts, however, were discontinued, and later political systems completely abandoned this realistic approach which could have been imparted to education as early as the dawn of the 19th century.

Another path has led contemporary pedagogy to attempt to burst the seams of an overly narrowed intellectualism and of a kind of education which is too bookish and relies too much upon verbal skills. What is being referred to here is the current which gave rise to the so-called 'new education'; to Kerchensteiner and his emphasis on physical labour, and to Decroly and his study of the environment.

Contemporary pedagogy is therefore faced with several issues which ought to be examined in detail:

● A trend derived from Decroly's school which takes into consideration the life experience of subjects (the study of their environments), for as we

have pointed out, the environment of present-day subjects is more and more a technological one. This means that the psychological activities which are part of education can and should start from the subject's experience; therefore, technological "culture" is part of education itself. Indeed, one can apply, step by step, all educational procedures: observation, analogy, comparison, analysis, to an explanation of the technological objects surrounding us: first of all, familiar objects, then increasingly large industrial complexes. Understanding the world in which one lives is the first stage of any genuine culture; does it matter if it be "general culture" or "technological culture"? The artificial boundary traced by history vanishes when confronted with an objective analysis of current situations.

● Professional requirements have introduced other pedagogical constraints: the range of professions has increased and so has the need for scientific and mathematical information so that vocational training will not remain at a level of learning equal to gestures without significance. The development and the structuring of technical cadres (unskilled workers, skilled workers, foremen, sub-engineers, engineers — the classification differs from one country to another and it is not our intention to discuss the matter here) have been accompanied by the creation of various educational cycles meant to impart the kind of knowledge required for each level of technical personnel. Why should one claim that a trigonometry course required for students preparing a degree in science is different from a trigonometry course taken by a future electrical engineer? Why should one say that the former is part of "general culture" and the latter, part of "technological or vocational culture"? We shall leave the responsibility for answering this question to those who still defend this distinction.

● On the other hand, vocational training itself has developed considerably. The former type of apprenticeship, limited to pure imitation, vocational apprenticeship based exclusively upon the handing down and the learning of "recipes", apprenticeship in a craft limited strictly to the professional requirements of that craft — all have been replaced by pedagogy of a type which seeks to explain and to account for the actions of professional accomplishment, to disclose the laws of science and of technology underlying everyday practice, to place the tasks of the worker, the supervisor, and the engineer into an expanded technological, economic, and social framework. Adding up all the aspects of such training, one obtains a set of data which, when well structured, results in a "culture". The concept of vocational training, when correctly understood, is not at variance with that of culture.

Philosophical and Social Development

The sets of ideas making up, in a more or less coherent fashion, a social or a political philosophy, have considerably evolved over the last two centuries and have undergone extremely different philosophical, political, economic, social, technological, and even sometimes biological influences. Without going into detail, I thought it appropriate to mention this point as a means of refocussing our discussion in a context which is both more real and more current.

A change in religious ideas ("by the sweat of thy brow shalt thou labour"), in the social domain (in the past, nobles did not have the right to work),

in the political domain (the recognition of social classes and of the working class), has caused the former image of the "workman" and of the technician to gradually lose the more or less pejorative connotations it still had in the last century. Today, labour in general, manual labour, and technological labour, have, so to say, been knighted. Working with one's hands or operating a machine are no longer viewed as cursed or even as shameful.

Sociologists, especially sociologists of vocational activities, have analysed the industrial and technological conditions of our civilization and have demonstrated the dignity of work and the need for intelligence in order to understand the modern world of which we are a part. On the other hand, the complexity of technological problems and their equally complex linkages with human problems are such that it is impossible to really understand the technological world without understanding the other major problems facing mankind. Hence the need for an opening onto the world and its problems or to say it differently, the need for general education to enable one to really benefit from vocational training.

Philosophers, epistemologists, and psychologists have pointed out "the various forms of the scientific mind" of today (Bachelard, particularly). The classical form of the past is now superseded by various forms of equal standing from the epistemological point of view, and certain authors do not hesitate to speak of "cultures" when referring to intellectual and artistic activities, not to mention sporting activities. Professional training does not necessarily lead to culture, but it can legitimately include cultural objectives among its goals.

Conclusion

Any vocational or technological type of training includes general elements of all levels of training: the imitation and the reproduction of skills, their assessment, their transfer from one situation to others, the situation of a given activity in time and in space. Is this general culture or technological culture? Should we not call it the human culture of the modern era?

BALANCE BETWEEN GENERAL EDUCATION, VOCATIONAL TRAINING, AND FURTHER TRAINING IN SWITZERLAND

Karl WEBER

1. Introduction

In Switzerland, the opportunities for and the limits of a new balance between general education, vocational training, and further training are basically influenced by two factors. The first of these factors is the rapidity of technological, cultural, and social change which is linked to the exponential expansion of knowledge. Setting the correct balance in these circumstances is primarily a matter of educational policy — a problem which confronts many other countries. The second factor, however, is typically Swiss. It refers to the federal organizational structures of the Swiss university system to which any balancing plan must come to terms. This article discusses the pros and the cons of the three types of educational offerings with regard to the two factors in question.

2. University Policies and Present-Day Realities

University policies are subject to fluctuation. At the beginning of the 1970's there was a call for a fundamental reform of the university system. This call was promoted primarily by students, with the expectation that a total reorganization of the Swiss universities would enable them to meet the demands of contemporary society. In 1978, the Swiss Council of Science, the federal government's advisory body on university affairs, issued its Third Report on Swiss Universities and Colleges. As this advisory body had reached the conclusion that students needed to be taught how to handle increased independence and to be given more encouragement to develop their problem-solving capabilities, the Report called for a reform of the courses of study offered so as to favour these aims. Since the beginning of the 1980's, demands for an expansion of Swiss further training facilities at the higher education level have been growing. Although at the onset only a handful of people connected to industry and to education recognized the importance of further training for future development, a very broad consensus on the issue now exists, including industry and university circles. An expanded system of further training is in fact a very important prerequisite for the exploitation of the opportunities associated with the new advances in the technological, social, and cultural fields. In this context, the Swiss University Conference, to which all the country's universities are affiliated, published its own report this year on the subject of further training at universities.

Today general agreement has been reached that:

— a further training system is better able to satisfy the individual's demand for knowledge — which can manifest itself differently at every stage in life — than the present organization of the education system. It not only enables the individual to compensate throughout life for certain deficits in his initial education; it also permits him to bring his knowledge and skills periodically up-to-date;

— the danger of a growing technological lag in Swiss industry has become more and more a possibility in the last few years. That knowledge ages very rapidly and that the turnover in science and technology is taking place with increasing rapidity are realities that are being perceived by increasing members of the articulate public. The aim of further training is therefore to keep up with new developments. The problem of how to harmonize education with employment should also be mentioned in this context. Although the education system trains the people who are later employed in trade, industry, and commerce, its ability to meet the needs of the three vocational areas is restricted because choices of study areas are the responsibility of the individuals concerned. The resulting constant need for readjustment can only be met through further training;

— further training is also important for the universities because those involved in it must leave their "ivory towers". University teaching staffs engaged in further training programmes have always stressed the beneficial effects of contacts with representatives of industry. They provide welcome feedback for the universities as to whether scientific concepts have been successfully translated into practice and also, whether difficulties have arisen in their application.

In the past, universities always tended to be slow to adopt recommendations favouring the reform of study courses. The same is true today with respect to recommendations in favour of the expansion of the further training system. This hesitance cannot be attributed solely to the relative lack of influence of the federal government, notwithstanding its full jurisdiction over the Federal Institutes of Technology; nor can it be attributed to a lack of funding. The problem seems to stem from the federal organization of the Swiss university system which seems to be having difficulties in dealing with the fundamental challenge which is being posed by further training. Indeed, the concept of further training cannot be developed unless it is considered in relation to the concepts of general education and vocational training at the university level. The functional and organizational structure of the university system itself must be discussed. The challenge indeed is great!

3. Characteristics of the Organizational Structure of the Swiss University System and Their Effects on the Courses of Study Offered

In order to determine what the possibilities in Switzerland are for the establishment of a new balance between general education, vocational training, and further training, one must first understand the principal features of the organizational structure of the universities.

The Swiss university system incorporates both federal and centralized elements in its organizational structure.

The two Institutes of Technology in Zurich and in Lausanne are entirely financed and operated by the federal government. Their functions being teaching and research in the natural and the engineering sciences, their primary role is to strengthen the economy and to contribute to the modernization of Switzerland as a whole.

The other eight universities are run by the cantons in which they are located. The State subsidizes their operational as well as their investment budgets. Thus, the economically less well-off cantons of Neuchâtel, Fribourg, and St. Gall receive greater federal funding for their universities than do the other cantons. The University and College Promotion Act which provides the legal basis for the support of the cantonal universities by the Confederation is less a framework law than a subsidy law. For instance, no federally-binding laws relative to university personnel exist which ensure the uniformity of university personnel categories and of salary scales. The federal structure has the effect of making university development dependent upon the socio-economic and political realities of the cantons to which they belong. There are even major divergences in the teaching and the research programmes undertaken in the two university towns of Geneva and of Basel. Even the structures of the bodies involved in policy-making differ greatly from canton to canton.

There have been periodic shifts in emphasis between federalist and centralizing tendencies within elements of the university system according to changes that have taken place within the conceptual frameworks of the universities. Thus in the 1960's the tendency was to transfer a large portion of the financial responsibility for universities to the federal government. In particular, the federal government was expected to finance one hundred percent of the costs of the natural and the medical sciences. The concept behind this tendency was closely linked to the discovery of human capital and the idea of a "Swiss University". A first round of attempts by the Swiss government to expand and to implement this concept through the passage of new laws failed because the cantons succeeded in defending their autonomy with regard to education. A second round failed later on because of a lack of funds. The trend at present is strongly in favour of a return to the federalist point of view (cf. Revision of the University and College Promotion Act).

Let us consider some of the many faces of this multifarious system:

— The cantonal universities are of different sizes: the University of Zurich, for instance, numbers almost 19,000 students, whereas the University of Neuchâtel — the smallest — has just over 2,000. The subject groups available also differ from university to university. The University of Basel, for example, offers courses in all branches of learning except engineering, but the University of St. Gall concentrates on economics and on business administration.

— Generally-binding nationwide educational norms exist only in the fields of medicine, dentistry, and pharmacology. The universities are more-or-less free to choose their *modus operandi* in all other fields of study (i.e. goals, length of study, and organization). Thus a graduate in economics from the University of St. Gall will present a different academic profile than one from the University of Basel.

— The nonuniformity of the university system is also evident with respect to personnel, facilities, and apparatus. The department of physics at the University of Neuchâtel is much less well equipped than its counterpart in Zurich.

This diversity is doubtlessly a reflection of Switzerland's cultural heritage, small size, and of the fact that the universities were traditionally obliged to cater to the specific needs of the cantons supporting them.

4. Overlapping Areas between General Education, Vocational Training, and Further Training in the Newly Defined Balance

Thus far I have outlined the basic organizational and academic elements required for the attainment of a new balance. Now, I shall consider the interrelationship between the three types of education.

4.1. *Interrelationships of Content and of Curriculum*

As a first assumption, the fact that the universities are adopting the structures of further training will not alone make a reappraisal of the general education system necessary. Rather, the visible ambivalence of scientific and technological advancement is what makes such a reexamination essential. At the heart of the issue is the question of whether one can assume that a person who is involved in research is necessarily also educating himself.

The question of the educational value of research is posed independently of our efforts to establish an optimal balance between the three types of education. Nevertheless, the answer to this question is the key to the meaningfulness of initial university education. The debate about it is a necessity of our times and is vital to all the branches of university level learning.

This question, however, cannot be dealt with simply as a matter of theory. It has to be analysed in a concrete environment, for instance, within the context of the development and the execution of research programmes or the organization of certain types of lecture courses. What is primarily needed here is to start a debate among students and educators in order to raise their awareness of social prerequisites and the consequences of scientific research. Such a debate might then become increasingly sophisticated as the persons concerned become increasingly competent in their fields of research. The questions which could be asked in this context might be the following: On what premise am I basing the research which I want to carry out? What are the possible consequences of this research? What results do I hope to achieve and what results must I reckon with? Are the results acceptable to me and to the others involved? etc.

In short: it is necessary from time to time to reflect upon the ethical dimensions of scientific research and to follow them up through interdisciplinary collaboration.

If the thesis that ethical reflection is an integral part of scientific research is correct, it will have to be given a permanent position in the fields of vocational and of further training. There are clear indications that the universities will consider the encouragement of such reflections to be in their interest. In the current situation, it can help to avert too great a loss of legitimacy on the part of science and of the university system as a whole.

A second assumption postulates that the relationship between vocational training and further training must be specially defined according to the type of education and, to some extent, to the type of university. This statement

is based on the realization that one can differentiate, at the university and the professional level, between two extreme types. The following distinctions can be made between these two extremes:

The Professional Level

Profession-Oriented Type of Student

This type of student orients himself with regard to "professional" requirements (i.e., those, for instance, for doctors, lawyers, etc.). The professional type is able to apply much of what he has acquired during his initial studies. Acquired knowledge and requested knowledge in a given profession are very similar. Although the ideal type of professional is self-employed, he is also found in employee-type positions (e.g. with managerial functions).

Function-Oriented Type

The function-oriented type of student is the direct opposite of the profession-oriented type. An example of this type is the mechanical engineer working in management. In such a case, there is often very little continuity between the initial training and the requirements of the actual occupation. The type of occupation, which is oriented towards problem-solving and decision-making, repeatedly puts the function-oriented type in situations in which he is faced with new problems and duties, requiring him to keep bringing his knowledge up-to-date.

University Level

Disciplinary Education

This type of education is the easiest to define when bearing in mind the classical form of universities.

Scientifically inherent goals are important. They develop and change according to the evolution of the subjects concerned. According to its inherent systematics, a subject is subdivided into special disciplines. Truth and cognition are their ends.

We therefore find subject types of students at universities who are particularly oriented towards individual disciplines.

Inter- and Multidisciplinary Education

This type of education occurs when attempts are made to put single components of knowledge together to form one complete picture. This picture can be of a certain area of a profession or of a problem. With that point of view, concepts of action become more important, while scientific methods become secondary.

Both disciplinary and multidisciplinary units can be offered as further training courses and both profession-oriented and function-oriented types of students can participate in them. The following figure shows the possible combinations which can be offered in further training courses:

University profession	Disciplinary education	Multidisciplinary education
Profession-oriented type	1	2
Function-oriented type	3	4

Subject-Related Further Training (1)

Subject-related further training presents no difficulties. It generally represents a specialized course of study in a particular field offered to applicants who have already graduated in this field and actually use their specialized knowledge on-the-job. This type of further training can be offered continuously.

Professional Further Training (2)

Ideally, this type of training should be offered to professionals whose initial university education catered, from a technical point of view, to their chosen professions. Universities offering such courses should dedicate their research work to the on-the-job activities of such professionals. Continuation is facilitated here, too, by shared knowledge of problem areas (example: medical specialist training).

Complementary Specialist Training (3)

Complementary specialist training cannot build upon the same foundation as mentioned for (1) and (2). The function-oriented participant in a training course is not as intensively preoccupied with specialized scientific problems as the profession-oriented. Complementary specialist training presents no difficulties as long as the participant has completed a specialized training course and is seeking a way to pursue specialized further training. The situation becomes problematic when the initial training has taken place in a different subject area and the participant is attending the further training course in order to acquire additional knowledge needed for his work. The course instructor then finds himself confronted with a participant who is neither familiar with the technical language nor with the underlying structure of the specific scientific domain.

Problem-Solving Oriented Further Training (4)

Nothing definite can be said about this type. Difficulties may arise if the multidiscipline-oriented teacher is himself strongly associated with a profession which is completely foreign to the function-oriented course participant (e.g., a medical faculty professor who must train hospital managers).

4.2. *Organizational Points of Reference*

Stability in the new balance between the three types of education in question can only be achieved and further developed if the individual univer-

sities and the university system as a whole agree to certain organizational changes:

— Within the universities themselves, the expansion of the further training system forces a rethinking of the traditional interrelationship between teaching, research, and the public service sector. The scope of work of university teaching staff members must increasingly become wide and varied. University teachers nowadays are faced with a completely new type of student, one who brings with him a certain experience of life and of professional knowledge which the traditional student does not have. The professor is challenged by the need for new teaching methods and for revised course contents. He needs to be provided with the necessary know-how in order to meet this challenge (e.g., through courses in didactics).

— The steady expansion of further training will sooner or later stimulate a reexamination of the scope and the range of initial training. If initial training is, from the beginning, oriented towards further training, then a broader spectrum of knowledge must be established from the beginning which will help students enter non-university working environments. This process can be both profession- and function-oriented.

— In concrete terms, teaching and research will have to be accomplished with increased regard to application; at the same time, the quality of the personnel and the adequacy of the financial means allocated to basic research and theory-oriented teaching programmes will have to be safeguarded.

— With regard to the overall higher education system, the expansion of further training leads to a deepening of relationships among universities, the other tertiary institutions, and the secondary and primary levels of education. Given this context, a question to be asked is how much value should be given to work experience in contrast to formal educational qualifications with regard to admission to university-level courses. If increased weight were to be given to work experience, which would be perfectly understandable in view of on-the-job learning processes (learning by doing), it would actually lead to a reclassification of the different levels of initial training in the tertiary field of education. If one were to favour a restrictive admission policy based upon formal educational qualifications, then the value of work experience would be deflated, at the same time, the orientation of educational offers towards professional problems would be undermined.

4.3. *Points of Reference with Regard to Competitiveness*

As the general further training market continues to expand, university further training courses will enter into competition with similar courses provided by other types of institutions. In this context, one should mention the courses provided internally for employees in business and industry, those provided by other institutes and organizations, particularly professional associations, and the privately financed courses offered by university institutes.

This situation is of utmost significance to the universities. If they should decide to expand their recurrent education programmes, they would be well advised to determine their areas of strength. Because of their already existing infrastructure and their highly qualified teaching staffs, the universities should be better prepared than other institutions to introduce new theories and methods into the further training process, be they acquired through their own research efforts or adopted from other sources.

A concentration on these strengths would probably lead to a reduction in the number of people applying for university-level further education courses, despite the continuing increases in the numbers of academics. In this way, the universities would be able to handle additional commitments to further training.

The type and scope of further training at universities can to a great extent be regulated according to the principle of supply and demand provided that the participant or his employer bear the cost of further training. No participants, no further training! Such a market-type of regulation would lead to a decentralized clarification of the demand.

5. How Can This New Balance Be Organized?

Although the establishment of a new balance between general education, vocational training, and further education is a complex process, the decentralized decision-making structure of the Swiss university system as well as the relative autonomy of the individual faculties and departments represent a good basis for the realization of the new tasks in question. This basis makes it possible to integrate regional economic and cultural needs as well as the needs of professional groups in the planning processes of further training programmes.

These innovations will of course not develop of their own accord. They will have to be induced. To do so will require the establishment of minimum institutional requirements within and between individual universities. Resources within the personnel and technical fields have to be tapped so that certain functions can be fulfilled. The following are the measures which will have to be adopted in order to bring about the above-mentioned innovations.

To begin with, the exchange of information and experience among participants in general education, vocational training, and further training has to be fostered.

In concrete terms, the following is suggested:

— Possible courses offered by universities and the actual requirements of industry have to be negotiated within the framework of further training. Thus the resulting negotiations would need to be conducted by a special body affiliated either with the governing boards of the universities or with the faculties. Such a role could comprise the following: the observation of the development of teaching and research in order to determine which concepts are ready to be integrated into further training; the evaluation of the needs for further education as expressed by industry; the establishing of contacts with "suppliers" and with "recipients"; the organization of further training, etc.

— Further groundwork must be laid within the university system so as to permit an evaluation of experience gained in the field of further training with regard to its significance for the organization of general education and vocational training. Further training can be instrumental in initiating necessary changes in university teaching as well as in research. The organization of collective learning processes within teaching units is the core of this concept.

In the second place, the exchange of information and experience among all the Swiss universities with regard to the various subject groups should be stimulated and systematized. The aim of this exchange should be the collective evaluation of the types of syllabi offered by the different faculties or depart-

ments (economics and business administration, for instance). Such an evaluation, in addition to the negotiation (see above), would permit the identification of certain gaps in the syllabi of the various departments and the endorsement of measures to eliminate them. Such an action would provide a particularly good framework for the consideration of issues which affect the country as a whole and prevent a one-sided orientation in education towards regional interests.

The intensive horizontal (between the universities) and vertical (within the universities) exchange of information and experience will allow each university to define its place among the Swiss universities. Each one — within the framework of "controlled competition" — will be able to develop its own unmistakable identity. They will thereby be contributing to the revitalization of the multiple facets of the Swiss university system.

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ACHIEVING AN OPTIMAL BALANCE BETWEEN GENERAL AND SPECIALIZED TRAINING IN HIGHER EDUCATION

Zoltán LÉVAI

The question of how to achieve an optimal balance between general education and vocational training in higher education is an old one. Even if we assume that a method for the perfect achievement of such a balance may never be found, the fact remains that the quality of vocational training itself is negatively or positively affected according to another balance: that between general and specialized (vocational) training.

As separate factors, general and specialized training play different roles in bringing about such a balance. Many persons believe that imbalances between general and specialized training can be corrected through further training. Although it may indeed give some good results, it cannot be regarded as the best solution.

The root of the problem is that we tend to view balance as a pair of scales. On one side we place general subject matter and on the other, specialized disciplines. Then we wonder why the scales tip toward the side of general subject matter (Figure 1).

We try, of course, to maintain equilibrium either by adding something to the side which is too light or by taking something away from the side which is too heavy. Unfortunately this process is very awkward, primarily because we do not place the two factors on the scales simultaneously. In fact, the usual practice in the training of engineers is to introduce the student, during the first 2 to 3 years of his course-programme, to general course material which is theoretical and abstract. Only near the end of his training, during the 4th or 5th years, will he be exposed to material which is concrete and practical, consisting, more or less, of specialized subject material (deductive structure of curriculum).

Such an order of presentation makes it *a priori* impossible to establish a proper balance. Our belief is that a bold step should be taken: the modification of the traditional deductive educational process.

The structure of the proposed new curriculum is *conductive*, meaning that *the teaching of the general and the specialized, the theoretical and the practical, the abstract and the concrete should be carried on simultaneously throughout the full period of education, from the first year to the last.*

In the case of a conductive curriculum, balance can be given almost automatically, because the general and the special is placed simultaneously in an optimal ratio on both sides of the scales (Figure 2).

A further advantage of a conductive curriculum is that it gives rise to training processes which are much more efficient than those of deductive curricula.

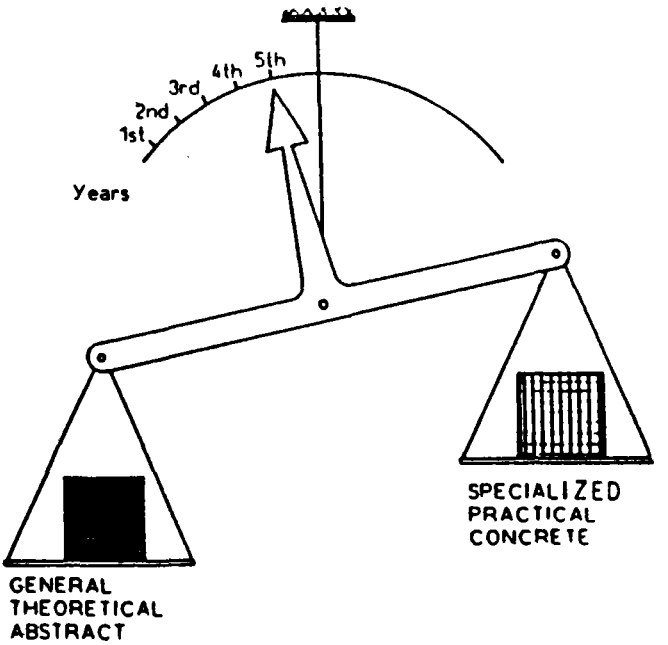

Figure 1

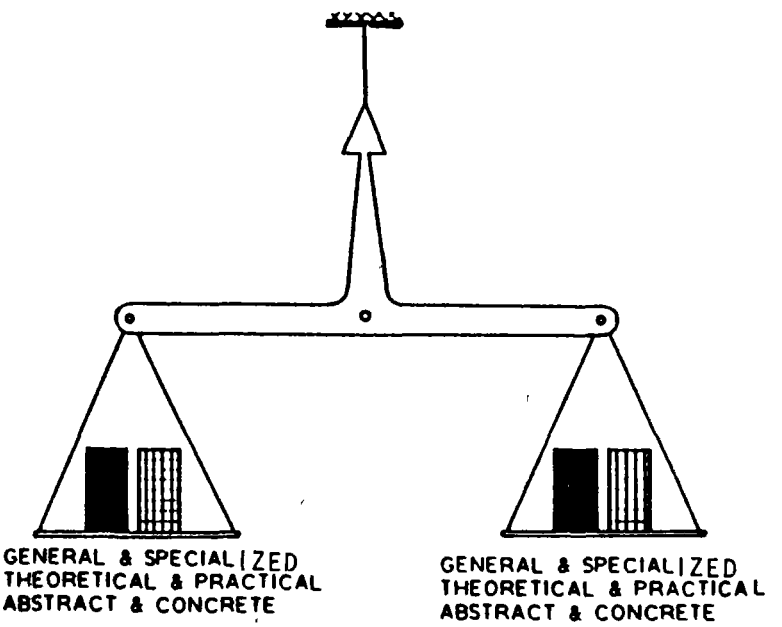

Figure 2

The educational process is extremely complex. To illustrate our argument, we have portrayed our conception of the educational process with the aid of a simplified algorithm (Figure 3), one which we hope will convince the reader of the need for conductive curricula.

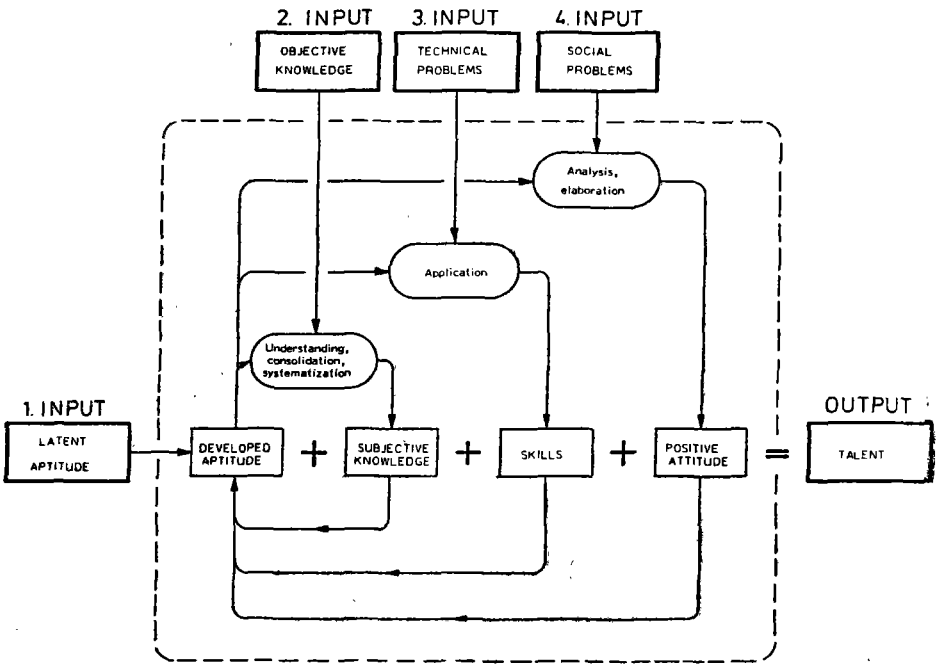

Figure 3

For the sake of simplicity, we have considered only four inputs and one output.

The first input is the *aptitude* of the student. Initially, it is mostly latent and undeveloped. (By *aptitude* we understand the sum total of the student's motivation plus his intellectual and physical/manual endowments).

The second input is *objective knowledge*, which consists of facts (data, phenomena, etc.) and generalizations (laws, theses, theorems, etc.). This knowledge is objective because it exists independently of the student. This knowledge, consisting of facts and of generalizations, may be general or specific, abstract or concrete, theoretical or practical, and so on. The subject matter of instruction, the course material, may consist of only a fraction of the available knowledge on a given subject.

The third input is a selected number of *technical problems*, and the fourth, a selected number of *social problems*.

The educational process consists of three large, interrelated cycles labelled respectively *understanding*, *consolidation*, *systematization*, *application*, and *analysis elaboration*.

Common to all three cycles is the personality of the student represented, in our case, by *developed aptitude*. Since the three cycles (also) contribute to

the development of the student's aptitude, the volume of developed aptitude increases steadily during training.

In the first cycle, objective knowledge is added to aptitude. With the same knowledge, the cycle repeats itself several times (many times in fact) with the result that the student develops *subjective* knowledge — i.e., knowledge which is understood, consolidated, and systematized by himself. At this point, the knowledge which the student has gained is of the type found in an encyclopaedia. The specifics of it depend on his field of study, its amount being commensurated with his learning capacity.

In the second cycle, aptitude plus subjective knowledge encounter technical problems. Here, the application of subjective knowledge results in the development of the student's intellectual and physical/manual skills, including the recognition, the definition, and the solution of technical problems. Here we could give a long list of the skills that an engineer might need, but we must stress the fact that a student can develop only those skills for which he has an aptitude. And indeed the aptitudes of given students show great variations.

In the third cycle, aptitude plus subjective knowledge plus engineering skills come up against social problems. In the course of the analysis and the elaboration of these problems, the student develops the *positive attitudes* which enable him to deploy his knowledge and his skills for the benefit of society.

The sole output in this algorithm of the educational process is *talent*, which consists of aptitude, plus knowledge, plus skills, plus positive attitudes, all of which must be highly developed. It is a matter of common knowledge that the development of skills and of attitudes is a *much more time-consuming* process then the development of knowledge: nevertheless, many engineering schools neglect the former or are overly late in dealing with them. The truth is that a deductive curriculum does not permit engineering problems (both technical and social) to flow freely from the beginning into the circulation process of training. Therefore, the circulation that occurs in the initial years does so mostly during the first cycle. Only knowledge increases.

We must caution the reader that even the increase in subjective knowledge is *not truly efficient* in the case of a deductive curriculum because objective knowledge alone is not linked to the practical applications which, in turn, would further all three of the partial processes making up the educational process as a whole: understanding, consolidation, and systematization.

Some say that even in the case of a deductive curriculum possibilities exist for the application of knowledge, a claim which is supported by exemples. Although there is truth to this claim, the connection between knowledge and examples, given the circumstances, is *simplex*. The student only experiences a single aspect of a given problem, not its complex nature. A student who happens to be studying mechanics, for example, will believe that he is able to solve *all* technical problems if he is adept at mechanics. A conductive curriculum, on the other hand, will lead him to *start from the problem* itself in some, although not in all, of the cases. He will thus realize that all technical problems are *complex* in nature and that he will need to have a simultaneous knowledge of *many disciplines* in order to be able to solve them. Moreover, this realization will *stimulate* the student to make further efforts so as to deepen his general, theoretical knowledge.

All things considered, a conductive curriculum also enables the student to attain the different elements of knowledge alternatively, by deductive and by inductive means, each in the way that best suits the given topic.

Generally speaking, the fund of objective knowledge possessed by mankind has been increasing for thousands of years, mostly by inductive means: experience followed by theory. The process whereby we try to produce subjective knowledge in the student from a fractional part of objective knowledge is in fact a *reconstruction* of knowledge. The process would be inefficient if only inductive methods were used — *but the other extreme is no better.* To increase knowledge purely by deductive methods is only feasible in the training of elites. The mass education of today requires the *alternation of deductive and of inductive steps*, a process which is made possible by giving a conductive structure to curricula.

Figure 4 illustrates the five main variations in the kinds of demonstrations (deduction or induction) which can be used in the teaching process depending on the character of the curriculum (deductive, conductive, inductive). As can be seen in the portrayals of an extremely deductive curriculum, on the one hand, and of an extremely inductive one, on the other, only approaches which are deductive in the first case and inductive in the second, can be applied. The conductive curriculum, however, permits the use of both deductions and inductions in an optimal ratio.

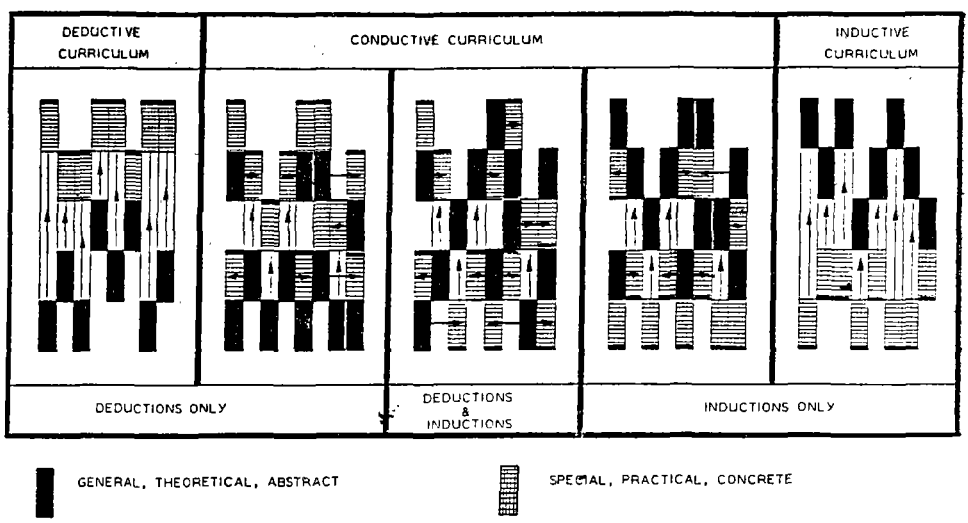

Figure 4

A rough approach to the design of a conductive curriculum would be the simple rearrangement of subjects as they are taught today. Thus a few general theoretical subjects could be shifted to the 3rd, 4th, or 5th years, and certain "specialized" and "practical" subjects could be advanced to the 1st or the 2nd years. Obviously, the contents of these subjects as well as the methods of instruction would need to be modified to some extent.

Such a curriculum has been in effect for about 10 years in the Vehicle Engineering Department of the Budapest University of Technology (Table 1). Although conductive quality is only roughly present, the order in which the courses are taught induces a certain kind of integration into the minds of the students. Were a wholly new curriculum to be devised, however, some of the subjects would need to be replaced by entirely new ones which would be based on the integration of subject matter.

Coming back to the question of balance, we must refer to the process of specialization which seems to begin much too early in the cases of conductive curricula. We wish to make clear that the specialization required for a *given* degree of a *given* nature should be included in a *given* curriculum as early as the beginning of instruction.

In today's era of mass education, it is inconceivable that a student, on registration for an academic course, would not know if he wanted to be an engineer, or a physician, or a lawyer, or a sculptor. This decision, however, is sometimes difficult to make, for it requires that the student have a thorough knowledge of his aptitudes, something which he does not often have at the age of 18.

An additional problem is that a student who wants to be an engineer must decide quite early as to the particular field for which he wishes to prepare: mechanical, civil, electrical, chemical, etc. Here too aptitude plays a role, but a much smaller one than in the choice of profession, for the relationship between aptitude and the chosen field is considerably weaker than is commonly thought. Sometimes it hardly matters whether a certain aptitude is exploited in mechanical engineering or in civil engineering, etc. Frequently the question is less one of aptitude than of mood or of other motivations which may play an important role in the decision.

But the process of specialization is far from over when a student opts for a special field. The student who has made up his mind that he wants to be, say, a mechanical engineer has to make at least two more decisions:

First, what does he want to do as a mechanical engineer? Does he want to be engaged in design, manufacture, organization, research, teaching, trade, etc.? In other words, what sort of *activity* does he want to carry on?

Secondly, what does he want to design, manufacture, etc.? Is he interested in automobiles, excavators, sewing machines, turbines, welding machines, etc.? In other words, what will be the *object* of his activity?

These two decisions do not carry equal weight. His choice of activity is much more important than his choice of object. Different skills are necessary for different activities. The development of skills depends on aptitude. In opting for an activity, the student should take his aptitude into account; he need not do so when choosing an object. The choice of an activity is final or, at least, lasting. In contrast, the choice of an object may be temporary; moreover, one's objects may change several times during one's career. The wrong choice of activity is hard to correct; whereas the wrong choice of object does not entail adverse consequences. The skills one needs for particular activities can be used in connection with many different kinds of objects.

It follows that in the educational process, specialization according to object (if it is needed at all) may occur sooner than specialization according to activity. The reason that this understanding is important for the student is that in numerous cases (although not always so), for methodological reasons,

Table 1

BUDAPEST UNIVERSITY OF TECHNOLOGY
Faculty of Transportation Engineering

Term	1	2	3	4	5	6	7	8	9	10
Philosophy	1+1	1+1	—	—	—	—	1+1			
Political Economics			1+1	1+1	1+1	—	—	1+1		
Scientific Socialism						2+2	—	—	1+1	
History of Hungary						1+1				
Foreign Language	0+3	0+3	0+3	0+3	0+3	0+3	0+3	0+3		
Gymnastics	0+2	0+2	0+2	0+2						
Driving of Automobile		0+2								
Human Electives					0+2	0+2				
Military Course					0+2	—	—	0+2		
Law									0+2	
Industrial Safety									2+0	
Computer Programming	1+3									
Engineering Physics	4+3									
Engineering Chemistry	4+2									
Engineering Drawing	3+2	0+4	0+2							
Mathematics	4+4	4+4	3+3	—	—	—	4+4			
Electrotechnics		4+2	3+2							
Mechanics		2+2	3+3	3+3	—	—	3+3	—	4+4	
Material Technology			4+1	3+2	3+2					
Economics of Enterprise				3+3						
Machine Parts (Mechanical Design)				4+3	4+6	4+6				
Thermodynamics and Fluid Mechanics					4+3	4+3	4+2	2+2		
Industrial Management						3+2				
Frameworks								4+2		
Contemporary Physics								3+1	3+1	
Automatic Control									4+2	
Specialized Courses										
Analysis of "Machine" and its mechanisms		4+2	4+2	4+2						
Service and Maintenance of "Machine"					4+2					
Manufacture and Repair of "Machine"						4+2				
Design and Research of "Machine"							4+6	6+9	3+9	
Diploma Work (Theses)										36

Digits show hours per week (lecture + practice) (15 week terms).
Depending on choice the "Machine" can be "Automobile", "Railway Vehicle", "Ship", "Airplane", "Building Machine", or "Materials Handling Machine".
After the 6th semester the students may apply for Industrial Engineer's Degree.

he should take advantage of opportunities offered and specialize according to object at the start of his instruction.

Our algorithm shows that technical problems are introduced as examples of application in the second cycle. However, several engineering fields (e.g. mechanical engineering) comprise ranges of objects to be considered which are particularly wide: from the vacuum cleaner to the ocean liner. Thus, from the point of view of didactics, one would be making a serious mistake if he were to take examples of application haphazardly from different objects because he would never be able to familiarize himself with the subject as a whole, with its multifaceted but nevertheless interrelated problems. His knowledge would be like a mosaic in which the individual pieces did not form a comprehensive picture.

A further disadvantage of this approach for the selection of objectives would be that it would spoil the efficiency of instruction, because the student would have to familiarize himself with too many data and descriptive attainments in order to understand the gist of the problem. Unfortunately, it is precisely these data and attainments that become obsolete very rapidly. Therefore, the student should be burdened with them only to a limited extent. A minimal burden can be supported if the problems and examples given always refer to the same object (e.g. the automobile), knowing that the student, who has taken his degree in engineering, may never in his life deal with automobiles. Nevertheless, the automobile will have filled its function, for the student will be able to make good use of all knowledge and skills he has developed in connection with the automobile in any other fields of mechanical engineering.

Here we should point out that in the educational process the student should sometimes be offered more than one "practice field" from which to choose. Of course, any choice of any field is in some sense a specialization in education. But a specialization can be a real one or only an apparent one depending on the breadth of general knowledge which is required to solve all the problems in the given field. The aircraft, for example, is a very good "practice field" in mechanical engineering because all kinds of theoretical subjects can be linked to it through its role as an example of application. Such is not the case for cranes or for textile machinery as they are hardly suitable for the application of aerodynamics or of heat transfer.

One should also note that if a student must choose a practice field, he should do so at an early stage of instruction. This statement shocks many people who believe that even specialization by object should be postponed until as late as possible. We are firmly convinced that delaying this so-called "practice specialization" is pernicious not only because doing so gives the curriculum a deductive structure, with all its negative consequences, but also because it increases the disadvantages of specialization.

We must also consider the fact that the timing of the inevitable specialization by object has a strong influence upon the mind of the student. If specialization by object occurs at the end of instruction, his intellectual horizon *narrows* step by step; in the last term, every subject will be centred around a restricted topic. If specialization (by object) occurs at the start of instruction, the student's intellectual horizon will be *constantly widened.* Even in the final

term most of the subjects will impart general knowledge; only during their application will the selected object come up. This approach is quite different from a qualitative point of view.

In the case of a deductive curriculum, the newly qualified engineer is led to believe that he has become a specialist, while in the other case, he has learned that he can deal with many different kinds of fields.

In the first case, the student only has the object in view; in the second case, he realizes that specialization by object is merely a means to an end: *a tool and not a goal!* The situation is quite different in the case of specialization by activity. Instead of acting with precipitation, the student should put the final decision off as long as possible. We have already mentioned that the activity, in contrast to the object, must be in harmony with aptitude. But how can a first-year university student know what skills he will need for any particular activity? Moreover, he probably does not yet know what his own aptitudes are.

It is also important that the development of those skills requiring a great deal of time for mastery be started at the beginning of instruction, along with the development of knowledge. What skills should be developed first? In other words, what sorts of activity should students engage in at the beginning of their studies? In the case of engineering education, we should start from the fact that one activity existing in the hierarchy of engineering activities represents the final link in the chain, the real purpose of all other activities. This activity is known as utilization and exploitation; operation and upkeep. Even a first-year engineering student should practice it, regardless of the specialization he will choose later in his studies.

This activity will enable him to gain a good grasp of problems, to see things in their correct perspectives — this being necessary for the development of his attitude. Whether he will be a designer or a calculator, an organizer or a researcher, he must, as an engineer, be able to perceive the ultimate goal: that his work give rise to the functioning, the worthwhile use, of something, somewhere, for the good of mankind. He must know the requirements of a given operation and take them into consideration, from the inception of the idea, through its planning, to its realization.

THE PROBLEMS INVOLVED IN INTEGRATING GENERAL EDUCATION, VOCATIONAL TRAINING, AND POSTGRADUATE EDUCATION INTO LIFELONG EDUCATION

Andrei VERBITSKY

The creation of the optimal relationship between general education, vocational training and postgraduate education is a problem which is being solved in the USSR by its assimilation to a broader problem, the creation of a unified system of lifelong education.

The idea of lifelong education is based on a programme goal set by the Communist Party of the Soviet Union (CPSU) and the Soviet State to promote the socialization and the humanization of education through the processes of social acceleration. Lifelong education (LLE) is regarded as a necessary condition for the all-around and harmonious development of the individual. As such, it brings about a continuous process of cognition and rational change (remaking) affecting nature, society, and man himself.

Personal development through LLE is, on the one hand, the leading goal of social production and, on the other hand, a means and an indispensable condition for socio-economic and scientific-technical progress. This correlation reflects the dialectics of the aim and the means applied to human development through LLE as moulded by the needs of science, culture, and production.

In order to bring about the reconstruction of Soviet society *(perestroika)*, it has been necessary to emphasize the humanistic potential of socialism, to mobilize the creative energies of people, to meet the growing spiritual demands of each individual, and to make effective use of the principal resource of social progress: human intellect.

The need for adopting LLE on a large scale has come about as the result of dramatic changes in the Soviet economy. Affected by what is in fact a scientific and technological revolution, the rates of industrial modernization and the renovation of industrial organizational forms have come to exceed the rate at which young scientists and technicians are being trained. As science and technology are being increasingly integrated, labour is becoming increasingly intellectual. Improved general education and vocational training are becoming the principal factors in the raising of labour productivity. These tendencies demand that specialists not only acquire vast knowledge but that they periodically update it.

Thus the main peculiarities of the restructured education system are as follows: emphasis on individual development and an orientation towards the future rather than the past, that is, the stressing as much as possible of knowledge, technologies, and life-situations that will be valuable 3, 5, and 10 years into the future. Knowledge, skills, and habits — education in general —

are no longer viewed as ends in themselves but as means for individual development. Close links between past, present, and future make cognitive and practical activities meaningful and socially valid.

Over the years, the USSR has developed a network of education institutions that collectively make up the system of public education. The system is currently undergoing global reform. Even political and economic education is being affected. The conditions which are favouring individual self-education have also favoured the creation of a unified system of LLE.

The advent of LLE is contributing to the need for restructuring the whole educational complex of the country. It is very much necessary that education include new elements and make changes in its relationship with other social institutions and spheres of public activities. What one hopes will emerge is an integrated system of LLE, one based on the prior integration, with respect to contents, forms, and methods of instruction, of nursery, secondary, and vocational schools; of higher and technical education institutions; of post-graduate and doctoral courses, and of different educational programmes including extension courses, political and economic programmes, open universities, mass media etc.

The achievement of such integration requires the following:

— the continuity of content and of educational technology when passing from one step of LLE to another;

— the development of permanent self-education programmes;

— the strengthening of the links of education and of self-education with other spheres of social culture, of production, of art, of family relations, etc.

Three life-periods predetermine the specific character of educational structure: a period of physical and psychophysiological ripening during which nature itself seems to contribute to individual development. This period is followed by a period of stability during which all the life forces and capabilities of a person flourish. The leading role during the second period is to be played by the post-graduate and the extension systems of higher education. Thirdly comes a period of reverse development. At this point, the need is for rehabilitation and retraining so as to regain lost skills and habits.

Nursery schools are called upon to develop the spontaneous and independent cognitive activities of children. What is important here is educational partnership which enables the child to assimilate fundamental intellectual and physical culture and which coordinates the contents and the forms of nursery school and family education. Thus pre-school (nursery) education may serve as a basis for LLE in later years.

Traditionally, the rolle of secondary education has been to place social experience and basic knowledge within the reach of children. Thus theory-oriented and formal experience-based education of the kind leading to the acquisition of formal knowledge has been given priority over practical training.

The advent of LLE presupposes a shift from mere reproduction of information to active and productive creative work. Such an approach to education should have as its foundation the development of those skills needed for the independent acquisition of knowledge as well as of its application and of its enrichment. Schooling should eliminate the dichotomy of theory and practice (which resulted from the division of labour), of study and work, and of intellectual and physical activity as a result of the complementary processes of the polytechnization of education and the intellectualization of production.

The education acquired should blend naturally with practical work and lead to the development of individual creativity.

Secondary schooling should promote the professional self-determination of each person. It should foresee all possible technological changes and innovations. Upon graduating from secondary school, a young person should in general be a fully developed individual who, aware of his abilities and capabilities, can choose a suitable profession and apply for a job or continue his education in a technical school or a college.

The system of vocational training should be made more flexible with regard to its educational content, required training periods, free transition from one educational institution to another, and the time necessary for adapting the student to his future in employment.

The role of the polytechnical schools within the system of LLE must be re-evaluated so as to take into consideration the fact that by the year 2000, as a result of the intellectualization of production, the number of technical workers will have exceeded the number of all the other categories of employees engaged in the national economy.

The bulk of the LLE courses will be of higher education level, since higher education is the level of education which is closest to actual production. It is the chief provider of basic vocational training; it produces highly skilled specialists and managers for all spheres of the economy, of science, of technology, of culture, and of the arts. Higher education influences all the processes which can affect society through the consciousness and the activities of its graduates. At the same time, it stimulates less skilled personnel to raise their educational levels. Higher education inspires in its graduates a steady quest for LLE and for self-education.

Higher education is also responsible for training the teaching personnel needed in all stages of the LLE system including higher education itself. Most Soviet scientists are concentrated in the various higher education institutions of the country. As they carry out research in all fields of the fundamental and the applied sciences, their concentration facilitates the role of higher education as the foremost propagator of scientific knowledge.

The Regulations which were approved by the Central Committee of the CPSU and the Council of Ministers of the USSR concerning the restructuring of the higher education institutions and the higher technical schools dramatically strengthen the role of both sets of institutions in the creation of the unified system of LLE. One of the main characteristics of the new system will be the integration of education, production, and science. The resulting unity will stand out as the principal factor in the acceleration of scientific-technological progress and as a major condition for a more complete development of human abilities.

One of the most important forms taken by the interaction of science, education, and production is the creative work of students in science and in technology, as well as their active participation in research, design, and projection. Nowadays, 50% of all students undertake research and design projects which lead to practical results. Every year, up to 40% of the graduate papers written help solve given technological problems. Students have been authors or co-authors of more than 90,000 scientific articles and reports and inventors or co-inventors of more than 9,500 devices of one kind or another. Such projects facilitate the adaption of young people to the world of work.

They offer valuable training in scientific methodology and are of vital importance for the continuation of the education and of the self-education of young scientists.

The USSR has already accumulated a great deal of experience in the training of personnel based on co-operation between higher education and scientific institutions and enterprises. This co-operation has included the learning-training programmes offered by special enterprises which combine classroom instruction and practical work, student research training programmes operating within the structures of basic scientific institutions, the setting up of academic chairs in various enterprises, and certain learning-research-production amalgamations.

A true integration of higher education, production, and science leads to a reconsideration of the traditional contents and methods of teaching. It leads to the development of new flexible forms of training, mastery of professional skills, and the retraining of personnel.

One of these forms, the plant-technological institute linkage has been particularly successful. In use in the USSR since 1960, the principal peculiarity of this system is the intimate bond which it creates between a student's academic work and his work in production. The result has proved to be both socially important and economically beneficial. A student's productive work in basic enterprises can lead to the generation of a profit covering up to 2/3 of his educational costs. In addition, this arrangement improves personnel training by permitting students to make use of complicated, sometimes unique, equipment, as well as the usual resources of research laboratories. A social advantage of the system is that it integrates students into their respective enterprises sufficiently well so that they are inclined to continue working in them when they graduate.

The integration of education, science, and production can also be helped along through the training of highly educated specialists by correspondence. Instruction of this sort will increasingly be based on the use of electronic means for the display, the collection, and the processing of information. Learning, especially independent learning, in between academic terms, will be facilitated by the extensive use of personal computers, teaching and supervising computer centers, automated information centers in libraries, and videotaped lectures.

A new type of relationship between enterprises, research centers, and higher education institutions will arise as the special training and retraining of personnel called for by the state plan is regulated by contracts linking the three partners. The industries involved are to be called upon to partially subsidize the costs of education. They will be asked to lend a helping hand to higher education institutions in the setting up of special shops, design offices, and scientific research laboratories for simultaneous learning and experimental processes. Now that Soviet enterprises are entering the world market with competitive products, the need to modernize technology and to develop creative and efficient management systems has become a vital factor which is stimulating the ever increasing participation of enterprises in the training of personnel.

A successful integration of education, science, and production requires, to a great extent, that basic teaching concepts be developed and applied in an effort to guide the transition from the traditional teaching process to real

professional activity by means of various forms of group activities, problem situations, simulation (role playing), scientific reasearch, practical training, graduation projects, and student independent work.

This LLE system also has a role to play in postgraduate education. In fact, it is here that it displays its greatest flexibility — constantly developing and giving birth to new educational forms and thus enriching teaching practice in society. For this reason, it is particularly necessary that the potential of higher education be used with increased effectiveness. It must be made accessible to workers and employees — to everybody, without regard to age. The role of the universities as active centres of LLE is increasing. The functions of postgraduate and doctoral courses are being enriched.

The restructuring of the system of further education and training demands that the content of education be improved. The traditional approach to defining basic knowledge and basic skills as well as the essential characteristic features of postgraduate study must be reconsidered. Educational content must adequately reflect the latest achievements of science, technology, and production experience. The contents of education must be coordinated with socio-economic development plans so as to emphasize training in the most demanding scientific and technological problem areas. Thus in 1987 the postgraduate curricula of relevant disciplines were re-examined. Teaching technology is being improved; computers are being introduced into the learning process; and games are being widely used in class.

Given an accelerating rate of socio-economic, scientific, and technological progress, the role, scale, and importance of the further training of personnel in the new fields of science and technology are increasing. Further education is providing the highly skilled specialists needed to maintain the current rate of technological advance and to perfect its management.

The system of further education also serves as an important means for the retraining of workers so that when the consequences of scientific and technological progress require them to change professions or places of employment, they can do so easily with a minimum of disruption.

The LLE system is not limited to the sphere of professional growth and individual development. It includes the processes of informal education which are aimed at meeting the cultural requirements of ordinary people as well as special clienteles, the elderly for instance, both retirees and those on the verge of retirement. Not only is LLE of humanistic importance in such cases but it plays an essential socio-economic role in helping to stimulate an increased life span and in enriching the intellectual and spiritual level of the whole society.

AN EMPIRICAL APPROACH TO THE ASSESSMENT OF THE BALANCE BETWEEN GENERAL EDUCATION, VOCATIONAL TRAINING, AND FURTHER TRAINING IN MEDICAL CURRICULA

Helge DOHN and *Jørgen NYSTRUP*

In Denmark, higher education is offered at universities and at colleges which award equivalent degrees. Traditionally, the training offered in universities has placed greater emphasis on general education than that offered by those colleges which are considered to be true professional schools, e.g., the dental and the pharmaceutical colleges, the Technical University, and the schools of business administration. Through the 1970's, university students had to complete a common propaedeutic course in philosophy leading to a degree comparable to the baccalaureate. Although this course vanished in the turmoil of 1968, courses of the same propaedeutic character, albeit with different contents, have recently been reintroduced into various fields of study including courses in the theory and the general methodology of science.

On the other hand, demands have been placed on the universities in recent years that they review their curricula in order to adapt them to the present needs of society — needs which include knowledge in such rapidly growing areas, as information processing, the biological and technical sciences, economics, business administration, and human relations.

The Educational-Sociological Aim versus the Educational-Psychological Aim

Very broadly speaking, then, one can distinguish between two approaches to the definition of the contents of curricula. One of these can be designated as the *educational-sociological* approach, in which curricula are planned as responses to the needs of present-day society, to the scientific applications required for the evolution of the sciences themselves, and to varying conceptions of man and of society. This approach is normative and time-dependent. The other approach can be designated as the *educational-psychological* approach. It is based on the knowledge of how and with what effect learning and problem-solving can take place. Such knowledge is independent of time as it is founded on observation, experimentation, and laws which, in principle, are verifiable.

Very often when the general education content of a curriculum is defined with regard to this approach, its aim is to facilitate scientific, systematic, and critical thinking; the transfer of concepts, principles, and methods; and the development of personal attributes and skills.

When examining higher education, one should expect the educational-sociological approach to hold a predominant place in the definition of curriculum content in professional schools and in professionally oriented studies such as law and medicine in universities in contrast, for instance, to what prevails in many study programmes in the liberal arts.

Within the conceptual framework of the two approaches to the definition of the content of curricula corresponding roughly to their vocational and general education components, we shall refer to a study of the medical curriculum at the University of Copenhagen in such a way as to attempt an empirical contribution to the above-mentioned dichotomy.

The Problem

With regard to developments which took place over the last 50 years, curricular guides today reflect a diminishing emphasis on the professional aspects of medicine. In contrast to the more practical-clinical training, the theoretical, i.e., the scientific subjects have gained a stronger foothold, and medical studies, a clearer academic orientation.

An analysis of the aims and objectives of today's curriculum indicates that in addition to the stated competencies required in the various subjects of the medical curriculum, much stress is being placed upon formative outcomes. Thus students are expected to acquire a thorough knowledge of the basic principles of scientific method and reasoning, good judgment, and the ability to carry out systematic observation, critical analysis, and synthesis. For instance, the argument is made that genetics and statistics, as well as other preclinical subjects, should be emphasized, not only because of the scientific expansion occurring in this area, but even more importantly because the students can thereby acquire a learning ability useful for graduate study and further education.

Thus, the curriculum content is apparently defined with explicit regard for its educational-psychological effect — particularly true for the preclinical subjects. On the other hand, the clinical parts of the medical curriculum are described as having a closer vocational orientation. Analyses have given rise to empirical examinations aimed at determining the extent to which various subjects can be classified either as primarily general educational in nature or as vocational education. As a direct assessment was not feasible, we have used evaluation ratings from a selected population as described below.

Method

The investigation was carried out by means of a questionnaire study which was mailed to randomly selected members of five groups: teachers at the University of Copenhagen (only holders of MD's were included) (n=42); medical students in their final years (n=114); recently graduated physicians (n=75); general practitioners (n=75); and specialists (n=54). Data were collected from December 1982 through March 1983. The questionnaire was constructed so that all the subjects and the symposia as well as the interdisciplinary teaching covered in the curriculum were arranged in disciplines.

Each discipline was rated on a scale from one to three according to its value in terms of the following dimensions: a. Importance of the discipline for further graduate study; b. Importance of the discipline for postgraduate training (these two dimensions were perceived as reflecting study facilitating effects); c. Capacity for promoting clinical skills, the dimensions most closely corresponding to the vocational training component of the curriculum content; d. Generation of a holistic attitude towards sickness and health, a dimension which in fact refers to the attitude of the individual concerned; e. Development of heuristic thinking and the promotion of the transfer of methods and of concepts — a dimension thus referring to the formative effects of the cognitive domain. Thus, the study defined the general education and the vocational training components from an operational point of view.

Educational Value Attributed to Curriculum Content

By means of a X^2 test, the homogeneity of the scores for each discipline in each dimension was examined to determine the extent to which the difference between the groups failed to reach the 0.05 or 0.01 levels of statistical significance. The results of the detailed analysis are not depicted here. The following pattern was noted:

1. The ratings differentiated the disciplines in such a way that a discipline was usually rated high on one or two dimensions and rather low on the remaining dimensions. Only internal medicine, surgery, and to a certain degree, physiology ranked high or relatively high in terms of all the dimensions. This procedure accomplished, the disciplines were ranked according to their specific educational profiles, i.e., the extent to which they furthered graduate or postgraduate studies, generated a holistic attitude, were capable of promoting clinical skills, and stimulated heuristic thinking.

2. A pattern of relatively high intergroup agreement, irrespective of the specific group which was responding, was found. Hence, it seems pertinent to view the ranking of the disciplines as reflecting their inherent educational value rather than as functions of the amount of medical experience of the respondents.

3. The actual educational value attributed to each discipline permitted a direct comparison with the description of the given disciplines as presented in the official curriculum guide. In many cases, there is a striking correspondence. On the other hand, a principal finding which should be stressed is that the broad educational value assigned to some of the clinical disciplines, in particular to internal medicine and surgery, was not anticipated. Likewise, the ranking taken as a baseline seems to indicate that the educational importance of some of the preclinical disciplines, as indicated in the curriculum guide, is overstimated.

Conclusion

By using educational content rather than curricular objectives as the basis for evaluation, one is able to make judgments in terms of the actual educational value attributed to disciplines. The assessment of curricular objec-

tives, on the other hand, only relates to the intended outcome. In the light of this investigation, a change in priorities so far as the content and the sequencing of curricula are concerned might be considered. Some support is given to the broadly accepted view that the clinical disciplines should be introduced earlier, not for motivational effect, as is often held, but because of their influence on the formation of a holistic attitude and the furtherance of heuristic thinking. It should therefore be mentioned that certain points of the revised medical curriculum, which is in the process of being introduced, seem to be in accordance, on certain points, with some of the results of the study.

The tendency of the ongoing curriculum revision is to strengthen the disciplines which form the foundations of postgraduate studies. It therefore seems justified, in light of the above described findings, that increased attention should be given to the methods and the general educational content of systematic postgraduate training in contrast to the mastery of details and of subspecialities. Such training would put heavy emphasis on the vocational educational components, as the bulk of this education occurs as "on the job training".

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GENERAL EDUCATION, PROFESSIONAL TRAINING, AND FURTHER EDUCATION IN TEACHER EDUCATION

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Teachers in Israel are trained either in universities or in teacher-training colleges. The training given by the universities is characterized by its tendency to emphasize scientific knowledge and research, thus maintaining a scholastic approach. Training colleges, on the other hand, have kept their focus on vocational training, thus maintaining a professional approach. A clear distinction, then, between general education and vocational training in teacher education has been established. But as a consequence of rapid technological, cultural, and social change, together with the gigantic expansion of knowledge and growing competition for achievement, this balance has been modified. The schools of education, which are parts of universities, are witnesses to an invisible power struggle that is currently going on between the need to expand scientific knowledge, pushed by faculty, and the need to accumulate relevant knowledge based on personal and professional expectations, demanded by students. In the teacher-education college, an opposing trend has developed. Authorities, submitting to public pressures, have tended to expand scholastic and academic skills at the expense of professional training, thus moving away from the basic goals of such institutions. Both types of institutions seem to be moving closer toward each other in terms of the needs of their major consumers, the students.

Yet the two types of institutions remain almost completely segregated from one another. Is segregation the best solution? Whatever the answer to this question may be, the integration of institutions is only a partial solution. What is required in an education system which calls itself democratic is modification of the specific system of higher education in terms of admission processes, curriculum development, processes of learning, and social atmosphere. Such a modification must be based on present and future scientific, technological, and social needs and must reflect a modification in goals, programmes, and methods of teaching. These needs must be reappraised through a dynamic approach. A general three-step procedure is suggested as a means for undertaking this process of reappraisal:

1. Reidentification of the goals of education at the levels of general education and of vocational training.
2. Elaboration of a curriculum that takes into consideration the general goals and the specific aims of education.
3. Development of effective methods of teaching so as to respond to personal and social needs.

How can this procedure be applied in teacher education?

I. The Goals of Teacher Education Must Be Reidentified

The members of any dynamic society must be prepared to adjust to new situations, particularly rapid change, and be able to resolve problems in all areas of their lives, including problems of a vocational, economic, social, psychological, and family nature. The possession of a broad scientific, technological, and intellectual background is important and at present is being strongly emphasized; so is motivation and stimulation to learn, to work, and to grow towards self-actualization. Yet, a human being functions with more than these capacities. Thus, as important as intellect is, it cannot replace the other components of personality which are required in order to deal with conflict and to re-adjust to new careers, places, and social status. Additional personality attributes such as: self-confidence, flexibility, leadership skills, good interpersonal skills, and expressiveness are necessary for healthy existence and growth. In general, and this is true of the teaching profession as well — "scholarship is valued above professionalism" (Junge, 1982, p. 48). Effective teaching is usually measured by the criterion of student achievement. Moreover, this principle goes far towards explaining why teacher-education candidates are selected according to cognitive-intellectual criteria (scholastic aptitude tests) and master-teachers, according to the test scores of their students.

The policy which is thus derived results from a technological approach to teaching rather than from deliberate orientation (Zumwalt, 1985). It may lead to a departure from the holistic goals of education as stated here. For good teachers who view themselves as curriculum-makers rather than as mere *implementers* — teachers for whom teaching demands constant judgment regarding ends and means in a contextually complex setting — a technological emphasis adds to their doubts as to whether they should enter or remain in the teaching profession. The result may be that only the less adequate teachers remain within the profession. Thus we are referred back to the issue of teacher-candidate selection.

Since there is evidence that presage variables (i.e. personality characteristics) may contribute to the prediction of teacher effectiveness and student achievement and satisfaction (Dunkin & Barnes, 1986), teacher-candidates must be selected according to proper criteria, the three usual facets of which are cognitive, communicative, and socio-emotional (Dunkin & Biddle, 1974; Rosenshine, 1971). More specifically, these facets refer to clearly-organized, rational thinking; verbal expressiveness, human interaction skills, self-confidence, leadership, and flexibility. In addition, an individual's general state of maturity (integrity) appears to be closely linked to his teaching success (Shechtman, 1983, 1987), a fact which comes as no surprise as self-integrity is directly related to self-confidence and flexibility. Only under such conditions can a person be loving and caring (human relationships) and be capable of directing energy at objectives and activities (leadership). The use of a proper selection procedure for teacher-education candidates is one step towards the broad holistic educational goals which we favour.

To conclude this consideration of educational ends, the suggestion has been made that "market"-oriented norms be replaced by a value-oriented approach which would deal profoundly with questions of priorities in education. Thus the answer which might be found for the question, "what is right" for education and for society is that each individual be helped as

much as possible to help himself. This end cannot be achieved by appealing only to cognition-intellect. Feelings, values, and behaviour must also be included by the adoption of a holistic approach towards the goals of education. Yet doing so requires a departure from the traditional contents of learning and the development and adoption of more creative teaching methods.

II. The Content of Learning Must Be Expanded

According to the traditional distinction made between general education and professional training, the former relates to the acquisition of knowledge, the development of intellectual skills, and the enlargement of understanding of ideas and values (Adler, 1982). Others have considered the application of skills and the use of knowledge as means for the development of coherent perspectives on culture and on the world. Thus, the ultimate goal of general education is to learn how to learn even though, in fact, what occurs in schools is "consistent and repetitive attention to basic facts and skills" (Goodland, 1984). Professional training is aimed at preparing learners for specific fields of science. Thus, its scope of knowledge is limited, being based primarly on information which is specifically relevant to the given profession including that derived by means of a period of practical work. A lack of balance between general education and professional education gives rise either to too heavy an emphasis on general concepts or to the imparting of limited, superficial knowledge.

Teaching at the university level tends to emphasize general education. It focuses on psychology, pedagogy, as well as on other subjects, all theoretical in nature, geared to the intellect, and requiring primarily cognitive skills. Practical training, in contrast, emphasizes the practical aspect of education in which the acquisition of knowledge is directly related to teaching experience. The university model runs the risk of irrelevancy because of its stress on the accumulation of data and concepts without an understanding of their application to educational settings. The college model, on the other hand, runs the risk of being banal, superficial, and of lacking sophistication. A better balance between the two models would provide more understanding, would increase motivation, and would result in the personal satisfaction of students. Theories should be taught, but they are best conceptualized when applied to real educational situations.

The problem of content, however, goes beyond the question of balance. It should include questions of human development and of growth which go beyond those covered in the normal surveys of child-psychology and of pedagogy so as to impart an increased understanding of the development of such attributes as self-confidence, leadership, and human relationships. At least one of the psychology courses should be geared to the development of the "self" of each candidate since the latter is the principal instrument used in the teaching profession. Programmes should include the imparting of skills in coping with conflictual and of stressful situations. They must satisfy the needs of learners, particularly non-traditional ones, whose specific difficulties and needs vary according to their particular stages of development.

A recent study which examined a group of professional school teachers who had returned to college for further training (Shechtman, 1987) demon-

strated that invariably the older and more experienced ones tended to choose courses within the areas of self-development and of interpersonal communication. They also tended to avoid subject matter and pedagogical courses.

The needs that such learners express lead them to choose such subjects as the solution of problems within their own families; personal growth; communication with difficult children, etc. Three explanations can be given for these tendencies:

1. Different stages of personal psychological development produce different learning needs.
2. Actual teaching experience reveals the gaps in one's knowledge which must be filled in by means of further education.
3. The complexity of modern society lays much stress upon the individual who consequently turns for help to support groups. Whatever the reason given, the needs in question must be met by further education. These same needs may also provide us with some valuable feedback of use to the conventional programmes of teacher training. Less segregation between teacher-education training and further training may be of great value to education. The difficulties inherent in the development of new programmes geared to answer personal and professional needs refer directly to the problems of methods, as such needs cannot definitely be satisfied by means of conventional teaching methods.

III. The Process of Learning (Methods Used)

The holistic goals of education delineated here and the new contents of learning which have come as a consequence raise perhaps the most problematic issue of all — that of educational methods. Certainly a departure from ex-cathedra verbal types of teaching, which are not followed up by practical application, is needed. Although inductive methods leading to training in conceptualization are certainly preferable, they are insufficient taken alone if personality growth is considered as an educational goal and is to be made a part of educational programmes. What remains to be tackled, however, is the affective level of human functioning, a level which, at present, remains virtually untouched at either the secondary or the tertiary levels of education (including teacher education).

Yet here is a level which includes values, attitudes, and feelings, all of which have a tremendous impact on human behaviour in ways which surpass mere cognition. But it is widely ignored because of technological attitudes towards teaching, the excessive ambition of teachers, and, to a great extent, I suspect, because of ignorance. Teachers have not been trained to deal with emotion. Therefore, they "invite" only the bodies and the minds of their students to attend class while requiring them to leave their emotions at home (Rogers, 1980). Teacher-education students must learn, through self-experience, how to deal with emotions. Only then, along with conceptualization of knowledge in the areas concerned, will they be able to better deal with their own affective levels of functioning and be in a better position to answer the affective needs of their students. Many methods exist whereby an affective aspect can be added to the educational process. Although these methods are beyond the scope of this paper, I shall mention a few of them:

bibliotherapy (using literature for personal growth); group dynamics and group counseling (facilitating personal and interpersonal growth); role playing (developing emphatic understanding through different roles); creative writing (personal awareness, catharsis, and growth) etc. Various theories as to affective intervention have been formulated, but I shall mention only one of them: "Values Clarification — Theory and Method" (Raths, Harmin & Simon, 1978; Kirschenbaum, 1977).

Portrayed below is a model for learning consisting of three levels: the information level, which is the most common; the conceptualization level, which has been much appreciated of late, and finally, the value clarification level which is the least known of the three.

This third level deals with attitudes, values, emotions, and behavior. Integrated into the processes whereby subject matter is learned as well as into psychology and pedagogy, the value clarification level makes the concepts learned relevant to each learner's reality thus giving rise not only to personal growth but also to a higher level of learning motivation and a deeper involvement in the learning process (Kirschenbaum, 1977).

Three-Level Learning Model

1. Information
2. Conceptualization
3. Value Clarification

All these methods require the replacement of conventional lecturing by learning based upon self-experience. In such a way, learning becomes more stimulating, particularly for non-traditional students who have been away from the classroom for some time or who may lack certain learning skills (such as the ability to memorize). These students have a much greater need than others to be able to include their accumulated knowledge and experience as parts of the learning process.

IV. Some Concluding Remarks

A new balance must be struck among the components of education that will take revised goals, innovative programmes, and effective methods into consideration. Doing so will modify the balance among the three types of education in favour of integration. All levels of education, from nursery school level to high-school and above, would benefit from such change.

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THE RELATIONSHIP BETWEEN GENERAL SECONDARY EDUCATION, VOCATIONAL EDUCATION, SPECIALIZED SECONDARY EDUCATION, AND HIGHER EDUCATION IN THE UKRAINIAN SOVIET SOCIALIST REPUBLIC

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While ensuring a unified approach to the education and the training of each generation of young people, the various elements of the Soviet education system tackle specific tasks linked to specific educational targets, the ages of pupils, and other factors.

Tables 1 and 2 presented below illustrate the structure of the system of public education in the Ukrainian SSR and the correlation between the different types of institutions making up the system [1].

Table 1

Numbers of Students according to Educational Category (in thousands)

	1970-1971	1980-1981	1985-1986	1986-1987
Total number of students	14.529	18.423	19.279	20.086
— enrollments in upgrading courses and in special courses on new subjects:	4.012	8.518	9.926	10.470
• in comprehensive schools	8.414	7.510	7.249	7.214
• in vocational schools	498	712	742	746
• in secondary specialized education institutions	798	803	809	805
• in higher education institutions	807	880	853	851

Table 2

Numbers of Graduates of the Secondary Comprehensive, the Secondary Vocational, and the Secondary Specialized Institutions (in thousands)

	1970	1980	1985	1986
Total	651	924	797	728
— secondary comprehensive school graduates	536	729	585	516
— secondary vocational school graduates	4	98	125	125
— secondary specialized education institution graduates (based on incomplete comprehensive education)	111	97	87	87

General secondary schools: These schools are in the process of transition into all-state general secondary education institutions. The development of the general system of secondary schools in the Ukraine is illustrated in Table 3 below.

Table 3

General Secondary Schools (number of students and teachers)

Academic year	Number of schools	Number of students (in thousands)		Number of teachers (in thousands)
		Total	Number of students in grades 9-10/11	
1970-1971	29.791	8.414	1.596	474
1980-1981	23.041	7.516	1.757	449
1985-1986	21.927	7.249	1.283	473
1986-1987	21.557	7.214	1.089	496

A solid material and technical base is being created to meet the tasks required of vocational training. Its structure and enrollment levels are given in Table 4 below.

Table 4

Facilities for the Vocational Training and the Professional Orientation of Senior Students in Comprehensive Schools (as of the beginning of the 1986-1987 academic year)

	Total	Facilities in urban areas	Facilities in rural areas
Numbers of interschool vocational facilities	524.0	370.0	154.0
Numbers of students in vocational training (the percentage which the latter represent relative to the total number of senior students in comprehensive schools)	19.5	24.9	9.0
Numbers of interschool workshops	146.0	99.0	47.0
Numbers of vocational schools in which comprehensive school students undergo vocational training	226.0	200.0	26.0
Numbers of work places, in thousands, equipped by industrial enterprises for the vocational training of comprehensive school students	308.0	165.0	143.0
The percentage which the immediately preceding category represents relative to the total number of work places	56.4	47.6	66.5

The principles of *polytechnic education* have been firmly established in the Soviet general secondary schools.

The paths followed by general secondary school-leavers is given in Table 5 below.

Table 5

The Placement in Employment or the Enrollment in Further Training of Comprehensive School Graduates Expressed as Percentages of the Total Number of Graduates

	1981	1985	1986
Numbers of graduates (10/11 grades) of full-time comprehensive schools	100%	100%	100%
— enrolled full-time in education institutions and in training courses	63	71	71
— entered employment in productive labour in the national economy	37	29	29

Vocational schooling: This form of education is aimed at training highly skilled workers for various branches of the national economy in secondary vocational schools. The schools in question form a part of the unitary educational system of the USSR.

The data given in Table 6 below testify to the development of vocational technical training in the Ukraine.

Table 6

Vocational Schools

Years	Number of vocational schools	Number of students (in thousands)	Student enrollment (in thousands)	The graduation of qualified workers (in thousands)
1970	892	448.0	306.4	270.7
1980	1091	629.9	416.6	382.7
1985	1196	711.3	458.7	427.9
1986	1224	730.1	475.5	430.8
In 1986: Number of day-time secondary vocational schools	1140	691.9	417.5	374.2
Break-down of the day-time secondary vocational schools				
— divisions based on incomplete comprehensive education	972	485.8	183.8	127.1
— divisions based on complete comprehensive education	1040	141.9	147.0	155.8
— students who received no comprehensive education	413	64.2	86.7	91.3
Evening secondary vocational schools and day-time schools with evening shifts	84	38.2	58.0	56.6

Secondary specialized education institutions: These institutions train skilled specialists and organizers of the primary links in production, the largest contingent of specialists in the national economy. At the same time, they offer general secondary education to their students.

General information on the development of the secondary specialized education system in the Ukraine is given in Tables 7—12 below.

Table 7

Higher and Secondary Specialized Education Institutions

Academic year	Number of higher education institutions	Number of students (in thousands)	Number of secondary specialized education institutions	Number of students (in thousands)
1970-1971	138	806.6	760	797.9
1980-1981	147	880.4	727	803.1
1985-1986	146	853.1	731	808.9
1986-1987	146	850.7	733	805.1

Table 8

Break-down of the Numbers of Students in Higher and Secondary Specialized Education Institutions (in thousands)

	1970-1971	1980-1981	1985-1986	1986-1987
Number of students in higher education institutions	806.6	880.4	853.1	850.7
Type of course:				
full-time	373.7	506.9	457.6	450.1
evening	125.8	103.9	97.0	93.0
extramural	307.1	269.6	298.5	307.6
Number of students in secondary specialized education institutions	797.9	803.1	808.9	805.1
Type of course:				
full-time	479.0	513.7	517.5	520.2
evening	107.0	76.0	74.0	66.6
extramural	216.5	213.4	217.4	218.3

Table 9

Number of Students in Higher and Secondary Specialized Education Institutions in Terms of Specialized Groups of Educational Institutions (expressed in thousands)

	Higher education institutions				Secondary specialized education institutions			
	1970-1971	1980-1981	1985-1986	1986-1987	1970-1971	1980-1981	1985-1986	1986-1987
Total	806.6	880.4	853.1	850.7	797.9	803.1	808.9	805.1
Industry and civil engineering	350.2	362.4	332.0	325.8	362.2	347.2	342.9	337.6
Transport and communications	57.9	62.0	60.0	58.6	74.9	75.1	68.1	65.5
Agriculture	65.6	86.4	88.4	88.4	112.4	111.2	107.0	105.5
Economics and law	61.6	77.9	75.5	74.3	113.4	119.7	100.9	100.2
Medicine, physical education, sports	53.3	60.2	58.5	57.1	72.4	66.5	83.9	84.4
Education	211.1	224.4	232.2	240.1	45.7	65.3	88.9	95.6
Arts and cinematography	6.1	7.1	6.3	6.4	16.9	18.1	17.2	16.3
Miscellaneous	0.8	—	0.2	—	—	—	—	—

Table 10

Number of Graduations from Higher and Secondary Specialized Education Institutions in Terms of Branches of the National Economy (expressed in thousands)

	1970	1980	1985	1986
Graduations from Higher Education Institutions				
Total number of graduations:	117.2	148.1	150.6	147.8
from full-time courses	55.2	91.2	94.5	90.8
from evening courses	16.5	14.8	14.3	14.1
from extramural courses	45.5	42.1	41.8	42.9
Branches of the national economy:				
Industry and civil engineering	43.0	59.1	56.4	56.0
Transport and communications	7.7	9.3	9.8	9.5
Agriculture	12.7	13.0	14.4	14.7
Economics and law	9.8	14.6	15.6	14.9
Medicine, physical education, and sports	7.5	9.9	10.5	9.9
Education	35.3	40.9	42.6	41.5
Arts and literature	1.2	1.3	1.3	1.3
Graduates per 10,000 of the population	25.0	30.0	30.0	29.0
Graduations from Secondary Specialized Education Institutions				
Total number of graduations:	209.5	232.2	236.9	238.7
from full-time courses	119.5	144.8	146.7	143.1
from evening courses	29.1	17.3	18.5	22.6
from extramural courses	60.9	70.1	71.7	73.0
Branches of the national economy:				
Industry and civil engineering	87.9	87.0	87.7	88.7
Transport and communications	17.5	21.3	19.3	19.0
Agriculture	28.2	33.5	30.8	30.9
Economics and law	35.5	46.1	40.7	39.6
Medicine, physical education, and sports	23.3	21.3	29.8	30.5
Education	13.7	18.8	24.4	25.9
Arts and literature	3.4	4.2	4.2	4.1
Graduates per 10,000 of the population	44.0	46.0	47.0	47.0

Table 11

Enrollments in Higher and Specialized Secondary Education Institutions (expressed in thousands)

	1970	1980	1985	1986
Total enrollments in higher education institutions	155.1	175.0	181.7	181.7
full-time enrollment in higher education	81.6	107.2	106.8	107.8
Total enrollments in secondary specialized education institutions	241.0	253.3	264.6	264.4
full-time enrollment in secondary specialized education	149.4	159.8	166.3	166.6

Table 12

Numbers of Graduates of Higher and Specialized Secondary Education Institutions

Years	Numbers of graduates of higher education institutions		Numbers of graduates of specialized secondary education institutions	
	Total	Mean annual	Total	Mean annual
1971-1975	632.6	126.5	1108.1	221.6
1976-1980	701.3	140.3	1122.8	224.6
1981-1985	748.4	149.7	1176.3	235.3
1986	147.8	—	238.7	—

The most wide-spread form of education is day study. On the whole, the training structures for medium rank specialists satisfy the principal requirements of developing social production. The list of occupations for which these structures prepare includes more than 500 denominations which are combined into 21 groups on the branch principle.

The Reform of General Education and Vocational Training: General measures for the reform of general education and vocational training are being implemented step by step, based on what was perceived in 1984 to be the evolution of national peculiarities and local conditions through 1990.

In implementing reform, the following key tasks are to be accomplished:

— improvement of the quality of education through a higher standard of teaching in every subject and the reform of curricula and of syllabi, textbooks, and teaching aids so as to eliminate overly complicated study materials;

— improvement of labour education by strengthening the occupational orientation offered in general secondary schools as well as their practical and polytechnic orientation; considerable expansion of the skilled workers' training offered in the vocational technical systems; implementation of the transition of young people to general vocational training;

— strengthening of the responsibility which young people should feel for the quality of their studies;

— enhancement both of the social prestige of teachers and instructors and of the level of their theoretical and practical knowledge so as to fully meet the demands of the public education system relative to the education of workers; increased salaries and improved living and working conditions for teachers and instructors;

— strengthening of the material-technical base of educational institutions;

— improvement in the structures of general education, vocational schools, and public education guidance.

Various changes are being introduced into the structure of the general secondary school. The number of 18-year old school leavers with incomplete qualifications entering vocational schools is to be nearly doubled. Labour education in grades 10-11 is to be combined with mastery of the principal skills necessary for material production in the productive sphere.

The different types of vocational-technical education institutions which existed earlier have been transformed into uniform types of education establishments: "secondary vocational schools" with divisions corresponding to trades, and the forms and terms of training depending on the educational

levels of those entering them. School leavers with incomplete qualifications study for 3 years, as a rule, in specialized training schools, acquiring occupational knowledge and skills and completing general secondary education. In order to acquire a higher qualification or to learn a more sophisticated trade, fully qualified school leavers enter the corresponding departments of specialized vocational training schools in which they study for up to 1 year.

During the 1985—1995 period, general secondary education for young people will be combined with general vocational training. All young people will have a chance to master an occupation before entering employment. This trend will lead to the amalgamation of the general secondary and the vocational schools.

Higher education institutions: Higher education includes universities, academies, institutes (colleges), and other types of institutions. Higher education institutions are the only education institutions which not only provide highly qualified specialists for the various branches of the national economy, for science, for culture, and for education, but also train scientific and pedagogical personnel.

The data given in Tables 7—12 testify to the structure of Ukrainian higher and specialized secondary education and to the correlation among the different forms of training (day, evening, and extramural).

At present, radical changes as recommended by the document, "Main directions in the reorganization of higher and secondary specialized education in the country" [2] are taking place as follows:

— close integration of higher and secondary specialized education with production and science, aimed at furthering their interaction according to new principles. One of these principles calls for the training and the retraining of cadres for special purposes on a planned, contractual basis whereby some of the expenses incurred will be covered by certain branches of the national economy;

— radical changes from large-scale mass teaching methods to a strengthening of individual approaches and the development of creative abilities of future specialists through independent study and active forms and methods of training.

The main organizational form for the training of instructional staff members for technical subjects are postgraduate courses. Such courses are set up in comprehensive higher education institutions. The latter fulfill all the necessary conditions for providing high level scientific supervision and the use of the best scientific equipment.

The data given in Table 13 testify to the development of postgraduate training in the Ukraine between 1970 and 1986.

Table 13

Postgraduate Students (in thousands)

	1970	1980	1985	1986
Total number of postgraduate students	13.5	13.2	12.8	12.7
Number of postgraduate students in scientific research institutes	4.7	4.5	4.6	4.5
Number of the above who were studying full-time	2.5	1.4	1.7	1.7
Number of the above who were studying part-time	2.2	3.1	2.9	2.8

	1970	1980	1985	1986
Number of postgraduate students in higher education institutions	8.8	8.7	8.2	8.2
Number of the above who were studying full-time	5.1	3.4	4.5	4.5
Number of the above who were studying part-time	3.7	5.3	3.7	3.7
Total number of postgraduate students completing a course in a given year	3.6	3.1	3.5	3.4
Number of the above in higher education institutions	2.3	2.1	2.3	2.3
Number of the above in scientific research institutes	1.3	1.0	1.2	1.1

The postgraduate course programmes offered by higher education institutions are an inseparable part of the single system of continuous education of the USSR and the principal form given to the regular training of scientific and pedagogical personnel. Postgraduate courses are aimed at deepening the theoretical, specialized, and ideological training of scientific and pedagogical workers. They permit the above categories of workers to master the methods and the means of scientific research and to gain the ability to carry out scientific, pedagogical, and educational work at a high level. Postgraduates are trained intensively in branches of the sciences in which they develop particular specialities.

Postgraduates who successfully complete their courses of study are awarded the title of "researcher" in their respective disciplines, e.g. engineer-researcher, economist-researcher, etc., and a corresponding diploma. They become qualified to hold teaching and scientific posts which require advanced levels of training. Time spent in postgraduate study is included in one's scientific-pedagogical length of service.

The advanced degree of candidate of science (M.A.) is awarded to those who having earned a first degree of higher education, having successfully passed qualifying examinations based on postgraduate course work, have written and submitted candidates' theses for public defense. The successful candidate for a candidate's degree must have demonstrated his capacity for scientific research by having solved a pressing scientific problem of theoretical and practical importance.

As of 1988, special doctorate courses, which will constitute the highest level in the single system of continuous education in the Ukraine, are to be set up at the leading higher education institutions. The latter will be composed of authoritative scientific institutes and sophisticated laboratories as research bases. These courses will aim at providing the highest level of scientific and pedagogical training for the cadres of newly founded higher education institutions as well as for those employed by the most important technological enterprises. The time spent in doctoral study is included in one's scientific-pedagogical length of service. [3]

Holders of the candidate of science degree who wish to earn doctorates may be appointed to posts of scientific workers for up to 2 years. In order to qualify for such appointments, the individuals concerned must have made important contributions to scientific research on key problems of the national economy and must have had their proposals for doctoral theses approved by the academic boards of given higher education institutions.

The advanced degree of doctor of science (Ph.D.) is awarded to those having already earned the degree of candidate of science and having written and publicly defended a doctoral thesis in a corresponding discipline. Candidates for doctoral degrees must prove that they are creative researchers, capable of being able independently to raise and to solve important scientific problems which lead to major advances in science and in practice.

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Tribune

STUDY ORIENTATIONS OF AUSTRIAN STUDENTS: RECENT TRENDS

Paul KELLERMANN and *Gunhild SAGMEISTER*

Introduction

Even today, little in the way of formal research on higher education is being undertaken in Austria. Neither a specific institution dedicated to research on the subject nor a coherent bibliography of specific studies exist. Possibly this situation has arisen because of the long tradition of universities in Austria, the University of Vienna having been founded in 1365 and the University of Graz being more than 400 years old. Perhaps the tradition is so strong, so taken for granted, that it is not perceived as an object of study and of research. A peculiarity of Austrian public administration, particularly as concerns the development of universities, has also had an inhibiting effect. Innovations are brought into being through formal regulations rather than through research and development within universities themselves. Therefore it is very typical of Austrian higher education that a new law will inspire a few isolated studies but that research is never relied upon to give the basic material for a new law. Thus it is not at all astonishing that what generally happens is that a scientist or an institute which is interested in carrying out a special investigation will ask the ministry for funding. Then, the ministry will give an order that the study be undertaken. The reverse is seldom the case.

After World War II, the sequence of the most important university laws was as follows: the 1955 "Hochschulorganisationsgesetz", the 1966 "Allgemeines Hochschulstudiengesetz" (to which should be added two special laws for the study of different disciplines), the 1975 "Universitätsorganisationsgesetz", and the 1981 "Forschungsorganisationsgesetz". (From 1981 through 1984 the parliament passed no less than 18 amendments to the university laws.) The principal purpose of all these laws is to regulate every field and every process from the creation of new universities to the curriculum of every course.

Regular but uncoordinated investigations into higher education began in 1966 with the "Analysis of the Increase (in the number) of First Year Students Attending Austrian Universities" (S. Sagaroff) and "Duration, Success, and Their Factors" (S. Titscher/H. Wisgrill) — two themes which in a more precise form became foci in the following years for several other studies including "Access to Higher Education", "Learning in Universities", and, over ten

years later — "Graduates on the Labour Market". Studies of the link between university and society in a historical and/or functional perspective (cf. Fischer-Kowalski/Strasser 1973; Burkart, 1985) have seldom been undertaken. The principal institutions which have undertaken research in higher education are as follows: the Institut für Angewandte Soziologie (Institute for Applied Sociology, Vienna), the Institut für Höhere Studien (Institute For Advanced Studies Vienna), the Österreichische Akademie der Wissenschaften (Austrian Academy of Sciences, Vienna), the Österreichisches Institut für Bildung und Wirtschaft (Austrian Institute for Education and the Economy, Vienna) and UBW (University for Educational Sciences, Klagenfurt). In addition to these institutions, the "Österreichische Hochschülerschaft" (Austrian Association of Students) and several individuals have produced some important studies.

Between 1978 and 1986, a so-called "Forschungsschwerpunkt: Universitäre Bildung und Beschäftigungssystem" (Research Centre: Higher Education and Employment System) existed in Klagenfurt. The foci of its surveys, case studies, and theoretical analyses included such subjects as access to higher education, socialization processes, status development, job searching, employment structures of graduates, the university and the environment, academic professions, and the social functions of the university. (The findings of this research were published primarily in the series "Klagenfurter Beiträge zur bildungswissenschaftlichen Forschung").

What follows is a report on the results of one of these projects.

Study- and Work-Orientation of First Year Students in Four Austrian Universities

At the basis of the following short investigative report* relative to the links between university access, selection of subjects studied, motivation, and employment perspectives was a project entitled "Development of University Access". Research for it, which was begun at the University of Klagenfurt in 1973—1974, had been enlarged by the 1986—1987 academic year to cover three additional universities: the University of Graz, the Technical University of Vienna, and the Economics University of Vienna. The investigation touched on 5,817 Austrian first year students (80%) out of a total of 7,239.

During the process of analysis, the authors developed four hypotheses:

1. During the last 20 years, the enlarged educational system including the university has increasingly assumed the task of occupying juveniles who otherwise would remain unemployed (Aufbewahrungs-These; cf. Kellermann, 1977, 1981).

2. For high school graduates, it has become increasingly difficult to decide on a particular subject of study in view of the changing structures of the employing organizations, decaying professional traditions, and diffuse individual interests ("Anomie-These", cf. Kellermann, 1985).

3. Universities, their faculties, and first year students are evolving in different directions. One expression of this trend is made evident by the diversity of study motivations ("Segmentierungs-These", cf. Kellermann, 1984, 1987).

* The investigation was funded by the Austrian Ministry for Science and Research.

4. The standard image of the typical student (young, unmarried, a secondary school graduate appropriately motivated, with financially well-off parents, clear study targets, etc.) no longer fits the reality of student life. (In fact, this image never fits reality in this unrestricted way.) The student population, which has become more and more differentiated, has been particularly conditioned by the increased admission of older students with professional experience to universities (cf. Huber, 1986).

The authors attempted to test the first thesis, that of the "custodial function" *(Aufbewahrungsfunktion)* of universities, by means of several questions. They asked first year students to state the conditions under which they would abandon their studies (having just begun them). In particular, they asked how the students in question would react to offers of suitable employment which would not require them to have university degrees. Almost four out of ten (37.7%) of the first semester students stated that they would drop their studies on this condition. When comparing the answers given to this question over a number of years by successive classes of first year students at Klagenfurt the authors observed that increasing numbers of students would interrupt their studies in order to accept appropriate employment.

The authors interpreted this finding as proof of their hypothesis that over the last twenty years the university has served to relieve the labour market of juveniles waiting for employment.

The authors also tested the "Anomie Thesis" (No. 2) by means of two questions: First, they asked students to state when they had chosen the subject they were studying. According to the hypothesis in question, those students who chose the subjects which they wished to study only a very short time before enrolling have more unstable orientations than those students who knew what they wanted to study a few years before enrolling. Of all the students canvassed, 16% had decided what to study only very shortly before enrolling. The figure for Klagenfurt was 20%. On the other hand, most first year students at the University of Graz and at the Technical University of Vienna had decided what they wanted to study as undergraduates years before high school graduation. Possibly the specific attraction of certain universities influences study choices as does the act itself of choosing subjects.

Also, as a part of their efforts to test the "Anomie Thesis", the authors asked students to state how sure they were of the kinds of occupations they wished to engage in after finishing their studies. Almost half of the students queried could not give a positive reply (for Klagenfurt, the authors found that the proportion of students giving a negative response has increased over the last few years).

The above two results taken together indicate that only a small number of first year students during the 1986—1987 academic year had been fixed as to their choices of study and their future careers for any length of time prior to university enrollment.

This result led the authors to a consideration of their third thesis, that relating to the multidimensional segmentation of university studies prior to university enrollment. Not only did they distinguish between students for whom attending a university is more a function of "push" than of "pull" but they also differentiated between subjects which are considered to be "soft" or "hard".

In order to test the thesis of segmentation, the authors canvassed the study motivations of students. Using the factor analysis of the SPSS-Programme, they obtained five student-types having very different motivations.

First is the "careerist", who wants to achieve a good occupational and social position. This type is very clearly represented by students at the Economics University of Vienna, but it also includes male students of law and female economics students at Graz as well as male computer science students at Klagenfurt.

The second type is the "generalist". His motivation to study is one of broadening his mind and of acquiring an understanding of societal problems and their interconnections. This student-type is to be found at the Economics University of Vienna, particularly among women, and at the universities of Klagenfurt and of Graz, particularly among male education and male and female philology students.

A third type is the "student without a real interest in studying" *(Verlegenheitsstudent)*, who at the same time cannot envisage the possibility of any other meaningful activity. He additionally wishes to obtain the advantages which come with the student identity card. The few women students of electrical engineering, mechanical engineering, and architecture and the male students in business education are of this type.

The fourth type is the "best student" *(Klassenprimus)*. He is characterized by the following statements: studying is the only possibility (for me) to attend to my special abilities" and "I'm very interested in scientific research". This type of student is typically a male student of medicine (Graz) or of electrical engineering, but the type also includes female students of mechanical engineering (Technical University of Vienna) and female medical students. The fifth and last type is the "part-time student", who wants to do something other than to fulfill the obligations of his employment. Students of this type, particularly at Klagenfurt, study economics, education, philology, and computer science.

Students, of course, have always had very differentiated motives for beginning their studies, but the large number of them who would interrupt them if they could obtain employment casts the whole question of motivation into a special light. If a person is pushed into a university because he cannot envisage the possibility of any other activity, he will select subjects which most seem to offer the possibility of a positive existence. Today, various indications suggest that economics and the technical fields will lead to the fulfillment of these hopes, but will such be the case tomorrow? Nevertheless, 36.6% of Austrian students opt for economics; 7%, for law; 4.8%, for medicine and for electrical engineering; 3.9%, for mechanical engineering; 3.7%, for architecture; and 3.6%, for computer science.

The "anomie" and the "segmentation" hypotheses (nos. 2 and 3), when manifested, are frequently accompanied by characteristics which not only evoke possible student roles but the current situation of society. As mentioned before, a characteristic of student cohorts of increasing importance is the proportion of part-time students. The latter tend to differ from other groups of students whose studies are financed primarily by their parents. Few of them have graduated from an academic high school or have parents who are higher education graduates. A fair proportion of these part-time

students are married, do not live with their parents, and have adequate financial resources.

Polls of employed part-time first year students indicate that 59 to 67 percent of them are primarily interested in broadening their minds and that 52 to 61 percent wish to develop their professional knowledge; however, 55 to 68 percent of them deny that the achievement of a good position in employment is a major motivating factor. These students are not certain they will complete their studies. The largest proportion of them are studying economics (46%). The students in question opted for this subject very shortly before university registration.

The two groups of students, the employed and the unemployed, differ in their working perspectives; only 37 to 48 percent of the employed students know for sure which profession they wish to practice after finishing their studies. At the same time, they would generally not interrupt their studies if a good employment offer came their way (26% to 40%), except in cases of occupational stress. This group of students differs from other groups both in terms of its expectations relative to the earning of a university degree and in terms of what its members expect of the content of university instruction. The university will have to adapt itself to such students.

In conclusion, the authors found that the four hypotheses were useful for purposes of analysis. Their empirical and theoretical results are as important for single persons as they are for the university and for society as a whole. They believe that the results should be used to influence political practice.

They believe that the following are not in the best interests of students, universities, and governments:

— that juveniles, for objective reasons, not be able to make clear decisions regarding their training and future occupations;

— that universities have acquired a custodial function for otherwise unemployed juveniles;

— that students, subject-specialization, and universities differentiate against one another;

— that modifications in student roles remain unnoticed.

Students already are displaying flexibility in attending universities, even though they would prefer to be employed, and in selecting subjects according to public recommendation. They thus cannot do very much more to improve their situations.

Universities must first become familiar with these results and then discuss them critically, making changes in organization and in study programmes. Next, they must take steps to enlighten students and to obtain resources from those who are invested with political power.

Given a societal situation characterized by changes in employment structures (increasing productivity, increasing national products, high rates of unemployment) as well as by developments threatening the very existence of mankind (problems as seemingly banal as the removal of trash, the extinction of plants and animals, the paralysis of social relations, epidemics, national and supranational conflicts, military threats, contaminated air and soil, etc.), everything that can be done politically to guarantee the appropriate qualifications of the available potential for employment must be done. In industrialized countries this means the scientifically qualified working potential.

By "appropriate" qualification, we do not mean the promotion of more elite and selective studies, universities, concerns, and disciplines; in short, the common "High Tech" ideology with its stress on competition. Reflection, as an orientation for action, has been lost; instead achievement and competition have become ends in themselves. A principal task of government is that of halting this trend and of formulating long-term aims in a sense of common responsibility. The universities should give major support to this work as they are the most important institutions for the undertaking of scientific work. But they should take into consideration historical and current conditions and the consequences of achievements necessary for society.

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THE DOCTOR OF EDUCATION DEGREE: A HARVEST OF RAPESEED AND RAGWEED

G. Patrick O'NEILL

Introduction

The continuous flood of doctorates into the United States and the Canadian marketplace has aroused much concern among some academics, government agencies, politicians, and the press, particularly in the last ten years (Ashworth, 1978; Cartter, 1976; Hughes and Sullivan, 1979; Morgan, 1976; National Academy of Sciences, 1978; Ott and Baker, 1977; Porter, 1972; Tenner, 1984; Zur-Muehlen, 1977, 1987). In the United States, for example, it is, "... estimated that, from 1980 to 1995, between 25,000 and 30,000 new doctorates will be awarded *each year*, although only about 100,000 college teaching jobs will open during the whole period" (Tenner, 1984, p. 80). If these figures are accurate — and they are official — there could be a surplus of approximately 300,000 Doctor of Philosophy (Ph.D.) degrees in the United States by 1995. According to the National Research Council (1983), education has consistently been the single biggest producer since 1970. In fact, the number of doctorates conferred annually in education has increased more rapidly since 1940 than in any other discipline (National Academy of Sciences, 1978). As a result, there were more doctorates granted in education in the 1982-83 academic year than in the computer sciences, mathematics, the physical sciences, the health sciences, the agricultural sciences, and the earth, atmospheric and marine sciences combined (National Research Council, 1983).

Concurrently, the number of institutions offering the Ph.D. in education more than doubled between the years 1958 and 1982 (Andersen, 1983). Moreover, the number of schools offering the Doctor of Education (Ed.D.) degree has quickly burgeoned to the point at which there are now more establishments offering the Ed.D. than the Ph.D. in education (Andersen, 1983). Consequently, the Ed.D. has become the most frequently awarded so-called professional degree in all of the United States (Knowles, 1977).

Yet ironically, a negative relationship has been found between quality, research productivity, and the possession of an Ed.D. (Anderson, 1975). Moreover, educators continually rank low, or lowest, among those who list research and development as their primary post-doctoral work. In 1983, for instance, only 5.2% of graduates with doctorates in education devoted their expertise primarily to research and development (*Chronicle of Higher Education*, 1984). This figure contrasts sharply with 70.2% in the physical sciences, 61.3% in engineering and 47.6% in the life sciences.

Understandably, then, the status of the doctoral degree in education is being increasingly challenged. This article will address several issues which help account for this sorry state of affairs. The concerns expressed are aimed largely at the Ed.D.; many of them, however, might equally well apply to the Ph.D. in education as administrations do not always distinguish between the two degrees.

Examining the Literature

Decidedly the discussion should commence with the initial intent of a research doctorate. Invariably, two fundamental themes emerge; namely, the Ph.D. programme was conceived and designed to prepare the graduate for a lifetime of scholarly and creative investigation, often in conjunction with a career in teaching at a university or college (Baldwin, 1977; Deighton, 1971; Spurr, 1970; Whitworth and Deering, 1981). Enough said of the Ph.D., but what of the Ed.D.? What exactly is the purpose of an Ed.D.? Is it a research or a professional degree? Here, the literature becomes extremely muddled. Truly, there seems to be much confusion as to the past and present status of an Ed.D. On the one hand, it is referred to as a professional degree (Andersen, 1983; Hillway, 1969; Knowles, 1977) and yet on the other, as a research degree (Deighton, 1971; Dejnozka and Kapel, 1982; Eells, 1963). This paradox is further compounded by statements like the following: "That Ed.D. and Ph.D. programmes were found to have more functional similarities than differences was not really surprising, since both are terminal degrees and are implied to have equivalent value. Presumably there is great overlap in the base of knowledge and competencies needed to function as a researcher or as a practitioner. It was apparent from the data that, generally, graduates of both types of degree programmes are prepared to operate in either capacity" (Andersen, 1983, p. 58).

Assuming equivalency, one cannot help but ask, why the added expense of two terminal degrees in education if indeed graduates can function in either capacity? Is it not time, as Whitworth and Deering (1981) suggest to, "... consider eliminating one or the other of the two degrees?" (p. 25).

If the two degrees are not equivalent, then one might assume that the Ed.D. is an inferior credential. In fact, evidence suggests that this is often the case. For example, Spurr (1970) maintains that, "... students and faculty alike regard the Ed.D. as an inferior Ph.D...." (p. 141). In supporting his argument, he proceeds to narrate several reasons that, "... contribute to making the Ed.D. a second-class Ph.D. and to the generally low status that the Doctor of Education degree has in the academic world" (p. 142). In a more recent survey (Schneider, Brown, Denny, Mathis, and Schmidt, 1984), "... one dean described the Ph.D. as the 'real degree' and the Ed.D. as the 'simple degree'. Another called the Ph.D. the 'quality degree'. And a third complained that Ed.D. students 'dawdle' through their programmes and squander faculty time in research seminars that are 'uneconomical' and 'unproductive'" (p. 618). Nonetheless, in the same report, more than one-third of the deans, "... said that no substantive difference exists between the two degree programmes" (p. 618). Both points of view are probably correct, as the

respective parties, no doubt, had different terms of reference. But, why all the debate and controversy and why has it persisted for so long?

The answer would appear to lie in the diverse nature of the degree itself. That is, there are Ed.D.'s and there are Ed.D.'s. Figuratively speaking, some could be heralded as "rapeseed", while others would be culled as "ragweed". In trying to be something to everyone, the degree has acquired the status of being a catch all-degree, an anything and everything degree. As a result, the Ed.D. has become an unknown quantity. This ambiguous state is clearly reflected in the continuous confusion that the degree generates in the literature.

Much of this confusion, however, can be credited to what, among others, Meckel and Trigilio (1975, p. 3) qualify as "learner-centred", "innovative", or "self-directed" education. Certainly, evidence (Ashworth, 1978; Vonk and Brown, 1978, 1979) suggests that many of these so-called "alternative" programmes flagrantly violate the cardinal rules of conventional academe. Nevertheless, these defiant organizations continue to dump their Ed.D.'s into the academic arena under the banners of flexibility, practicability, versatility, or whatever else is socially, politically, and intellectually expedient.

Unfortunately, however, in the process, education as a graduate discipline has suffered serious disrepute (Wolf Jr., 1980). It would seem wise, therefore, to either drop the degree entirely or restrict its conferral to a limited and very specialized clientele.

Maintaining Minimum Standards

Should the degree be retained, there is pressing need for colleges and faculties of education to enforce five fundamental principles. First, there must be arduous and uniform screening devices. Potential candidates should have earned no less than first-class honours standing in their Master of Education degrees, proven track records in either teaching or educational administration, or both, and acceptable scores on reputable graduate examinations. The graduate examination should be administered through a central agency which eliminates the possibility of circumvention by less scrupulous institutions, traditional or otherwise.

Second, there must be a full-time residency requirement of no less than either one calendar year, or preferably two academic years. Such stringent regulations appear to be in line with most existing internal programmes at least on paper if not in practice. For instance, a recent survey of 167 universities offering doctor's degrees in education found that, "Most often three years of residency was required beyond the bachelor's degree" (Andersen, 1983, p. 56). Moreover, residency requirements could not, as a rule, be met by enrollment in summer sessions. As expected, exceptions, when permitted, were more common for the Ed.D. than for the Ph.D. Also, in another survey of 81 institutions offering the doctorate in educational administration, Trautmann (1977) found that most, ". . . require a one-year residency . . ." (p. 208). Specifically, the student was required to reside on campus for one year and *not* be employed during that period of time. Once again, exceptions, when permitted, were more common for the Ed.D. than for the Ph.D. Other definitions and descriptions of the doctorate likewise endorse a two to three year

residency requirement (Blishen, 1969, 1970; Deighton, 1971; Good, 1973; Hills, 1982; Unesco, 1979).

Third, programmes should include mandatory research courses similar to those suggested by Dill and Morrison (1985) in which "Management statistics, the introductory course for the Ed.D. sequence, would introduce descriptive and inferential statistics, placing greater emphasis on probability, multiple regression, and the application of these quantitative concepts to decision-making problems. This exposure would prepare the student to read and critique empirical research" (p. 183). Such research tools are indispensable assets of the professorship, if, as evidence suggests, most graduates plan to pursue a career in higher education (National Research Council, 1983; Solmon, Kent, Ochsner, and Hurwicz, 1981; Zur-Muehlen, 1977). Indeed, "... unless individuals have extensive training in research and an established record of publication, Ph.D. holders will have little opportunity to obtain a teaching or research position in higher education" (Dill and Morrison, 1985, p. 177).

Fourth, Ed.D. candidates should be expected to generate and orally defend an extensive piece of research, one that has both practical and theoretical implications. In addition, the document, or dissertation as it is most commonly known, should be of such quality that it can be condensed and disseminated in scholarly and professional periodicals. Such a requisite is not unknown in Europe where the candidate's work must be published before the degree can be awarded (Knowles, 1977). Repeated calls for similar standards in America (McPhie, 1960; Morgan, 1976; Taira, 1984) have regrettably gone unheeded. Instead, the doctorate in education has degenerated to the point at which "Even dissertation requirements are being profoundly modified. Written synopses of educational 'projects' and 'term-type' papers will satisfy the dissertation requirement associated with quite a few Ed.D. programmes" (Wolf Jr., 1980, p. 42).

And last, but not least, there must be a maximum time allotment for the completion of the degree. A five to seven year span would seem to be most appropriate, for it conforms to the current norm (Andersen, 1983).

Further, it is imperative that these five principles be constantly monitored by a strong, central body which would have the power to rescind degree granting privileges. At the same time, control mechanisms should be devised that would insure absolute compliance. Under no circumstances should policy statements be altered, relaxed, or waived. Institutions that failed to comply would first be publicly reprimanded, and, if necessary, censured, blacklisted, and expelled from all official associations within state or provincial jurisdictions.

Calendar requirements must become more than window dressing, and universities must stop giving lip service to double standards. For example, if the programme requires a two year residency, then candidates should not be permitted to substitute summer sessions for all, or part, of the two years as the residency component has been, "... strongly recommended to encourage collegiality and research" which can be best facilitated "on campus" (Trautmann, 1977, p. 209). Tampering with this segment of the programme does the student a disservice, the discipline a dishonour, and the degree a disfavour since findings indicate, "... a substantial relationship between research productivity and the amount of time spent in continuous full-time residence as a doctoral student" (Anderson, 1975, p. 401). Yet, personal observation

suggests that exemptions are widespread even among so-called traditional or mainline institutions. Not surprisingly, others have come to similar conclusions (Schneider et al., 1984; Wolf Jr., 1980). Specifically, "... residency requirements have been modified, they often do not seem to be enforced, and they occasionally do not exist (remember Walden U.?)" (Wolf Jr., 1980, p. 42).

Starting Anew

This section offers some constructive recommendations that could help resolve past infractions, strengthen present commitments, and improve future recruitment practices. The first suggestion is directed at recent doctorate recipients who short-circuited the system. These shirkers might have their degree status rescinded until they fulfilled the fundamental principle(s) which they neglected in the first instance. For example, if students circumvented the residency requirement, they could be obligated to spend one full calendar year on campus in a research assistant capacity. The year could be devoted to further study, research, and the publication of their dissertations. In so doing, they would be making a worthwhile and scholarly contribution to the field, an achievement conspicuously lacking among most graduate students (Falk, 1985; King, 1981; Mitzel, 1982). Indeed, most dissertions, "... are written, approved, and ignored by all but *Dissertation Abstracts* (King, 1981, p. 6). Yet, the dissertation provides the student with an excellent opportunity to demonstrate his/her writing skills, assuming, of course, that the document was initially well researched.

The second proposal is aimed at students currently enrolled in doctorate of education programmes. These candidates might be required to publish their studies before their degrees are awarded. After all, it is one feat to obtain consensus among comrades in a dissertation defense but quite another to publish in a refereed periodical. Assuredly, the true test of the product is blind, independent review by experts in the field, not the approval of old boy networks. Besides, "One consistent theme in data on faculty productivity is that professors who publish early in their careers (even while still in graduate school) tend to continue scholarly activity throughout their tenure at an institution. The popular notion that faculty who have never before published will suddenly become published writers during retirement when, presumably, more time is available, is totally unverifiable. In an exhaustive review of the research literature on faculty research productivity, Bean concludes that 'nonproducers remain nonproductive and do not improve with age'. Faculty priorities, rather than time, are of the essence where publication is concerned" (Jalongo, 1985, p. 175).

The third measure is concerned with both contemporary and future screening strategies. Evidence indicates that, "... schools which are most selective in their admission procedures are most productive of researchers in education (Anderson, 1975, p. 402). In other words, "... the greater an institution's selectivity, the greater is its output of researchers" (Anderson, 1975, p. 402). Findings also reveal that age of entrance is an important determinant of productivity. That is, younger candidates tend to be the most productive researchers (Anderson, 1975; Dole and Baggaley, 1979). Considering that the average completion period is five to seven years, the cutoff age might be geared annually to the median age of graduates which was 37.4 and 37.8 for

1981-82 and 1982-83 years respectively *(Chronicle of Higher Education*, 1983, 1984). At the same time, these data do not mean that older candidates should be emphatically denied entrance to doctorate programmes in education rather they "... suggest that admissions officers should look carefully into the credentials of older applicants in an effort to find compensating strengths" (Dole and Baggaley, 1979, p. 426).

Conclusions

In retrospect, this article has examined the status of the doctorate in education with particular reference to the Ed.D. Warnings of overproduction and poor quality have been repeatedly echoed in the past; however, as Ashworth (1978) aptly points out, "... the integrity of higher education is on the line. But the question is, who is paying any attention within higher education? The university faculties do not seem concerned, and some institutions are prostituting themselves as they offer their purportedly educational services in exchange for money" (p. 175).

Viable alternatives and tentative solutions to the crisis are tendered, but historical precedent offers little, if any, hope. Instead, it appears that the state will be forced to intervene. Calls for legislative control are already beginning to surface (Patterson-Griffith, 1983). Should the interventionists fail, then the Ed.D. could become, if it is not so already, a proverbial laughing stock. Then, much to everyone's dismay, someone somewhere will surely say, "I told you so !".

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GIFTED STUDENTS IN THE UNIVERSITIES OF THE SLOVAK SOCIALIST REPUBLIC

Sylvia BRYCHOVÁ

1. Study and Learning Possibilities for Gifted Students

One of the major tasks facing universities today is their transformation into centres of creativity and of knowledge diffusion, both activities being geared to the furthering of scientific-technological progress and its application to social practice. As a crucial aspect of the task is the efficient incorporation of the latest scientific findings into teaching, the forms and the methods of undergraduate studies must be modified in ways that combine research with teaching. In so doing, not only will student creativity be enhanced but graduates will be better prepared to work with other people and to hold positions of responsibility. The selection and the training of gifted students acquire particular importance in this respect.

As higher education in the Slovak Socialist Republic has increasingly taken on a mass character, efforts at reform have emphasized the link between teacher and student, particularly in the case of gifted students. The teaching methods, which have at best been bearly suitable for the masses of average students, have proven to be very inflexible so far as talented students are concerned, becoming hindrances rather than aids to learning.

The individualization of studies has been the object of recommendations of the Central Committee of the Communist Party of Czechoslovakia and of legislative and governmental acts. Worth citing in this respect is the Central Committee Recommendation entitled "The Further Development of the Czechoslovak Education System", adopted on 4 June, 1976, the University Act of 10 April 1980, No. 39/1980, of the Czechoslovak Federal Assembly, and the Directives of 21 July 1980, No. 105/1980, of the Ministry of Education of the Slovak Socialist Republic. Indeed, all of the above served an additional purpose in that they called for the identification of particularly gifted students and the creation of modalities for the acceleration of their training for research and for leadership roles.

The acts in question have also given a major boost to the establishment of interdisciplinary study programmes. Although of obvious use in the training of graduates for professional activities requiring proficiency in two or more disciplines, such programmes are expensive to establish and to maintain. Particular care must be taken to link them to professional practice and to choose students who are absolutely sure as to their vocational objectives.

A more flexible and ultimately cheaper way to obtain the advantages of interdisciplinarity is through the differentiation and the individualization of

study courses. Not only does this approach lend itself to rapid innovation but it is particularly suited to the needs of the very gifted.

The following possibilities are available for such students:

a) in-depth study in certain groups of disciplines;

b) broadening of study concentrations through the addition of collateral subjects, particularly those linked to future professional practice;

c) shortening of the normal period of studies required for given diplomas and degrees in combination with early admission to post-graduate studies and assignment to research projects;

d) interdisciplinary studies when justified by the needs of social practice;

e) special study at institutions other than the ones of principal enrollment or special study in "home" institutions if justified by the particular characteristics of the individualized study plans of given students.

All individualized study plans, whatever they be, if intended for highly gifted students, must stress theoretical preparation, advanced methodologies, and research. The following types of intellectual and educational activities are suitable: consultations with study advisors, special seminars, laboratory work and training in computers, construction projects, clinical exercises, biological experiments, field work, technological exercises, language training, special lectures, advanced level courses and seminars, study leaves, production practice, and work in so-called educational-research-production associations.

Students who have undertaken individual study plans must be evaluated regularly, particularly with regard to the fulfillment of their agreed-upon individual schedules.

Educational-research-production associations are a new type of university-industry link. They have proven to be particularly valuable for preparing students for their future careers. The Mathematics and Physics Faculty of Comenius University and the Chemical-Technological Faculty and the Faculty of Architecture of the Slovak Technical University, both located in Bratislava, have created links of this sort with various enterprises in the region. The students involved gear their individual study plans to the possibilities for research and for problem solving offered by the particular associations to which they are assigned. Indeed, they do their practice work under the auspices and supervision of the latter.

The organization of instruction via the educational-research-production associations can be particularly advantageous for the gifted, for these associations lend themselves to the elaboration of individualized study plans with sufficient similarities to permit the grouping together of students with similar interests. The more such students can be grouped together, the easier it becomes for teaching staff members to supervise them, and with increased teaching efficiency comes the possibility of enrolling increased numbers of gifted students into these plans.

Even in the case of straight university teaching and course work, the elaboration of individual study plans for gifted students has had the effect of increasing the flexibility of the whole university curriculum. It has forced the teaching staff to reach optimal compromises between the need for uniformity and tendencies which are pushing in the direction of diversity. And it has sensitized the higher education system as a whole to the need not only of providing special opportunities and care to gifted students but to be constantly on the look-out for ways of identifying such students.

2. Identification and Selection of Gifted University Students

In order to assist universities in the identification and the selection of gifted students, the Ministry of Education of the Slovak Socialist Republic elaborated a "Model System for the Selection of Gifted and Talented Students and for Working with Them". It was discussed at a meeting of university rectors and of deans of independent faculties held on 28 April 1983. The system has been in use in the universities and the independent faculties of the Slovak Socialist Republic since the start of the 1983—1984 academic year.

Table 1 gives the number of gifted and talented students in Slovak universities (with the exception of the arts academies in which all students are classed as gifted and talented) during the 1984—1985 academic year.

Table 1

UNIVERSITY	Total enrollment	Number of gifted and talented students	Percentage of gifted and talented students
Comenius University, Bratislava	7,637	497	6.5
University of Pavol Józef Šafárik, Košice	3,565	97	2.7
The Veterinary University, Košice	974	55	5.6
The Teacher Training College, Nitra	1,248	67	5.4
The Teacher Training College, Banská Bystrica	1,236	46	3.7
The Slovak Technical University, Bratislava	12,328	884	7.2
The Technical University, Košice	7,140	86	1.2
The University of Transport and Telecommunications, Žilina	4,772	206	4.3
The University of Economics Bratislava	5,160	201	3.9
The University of Agriculture, Nitra	3,300	114	3.5
The University of Forestry and Wood Technology, Zvolen	1,435	146	10.2
Total	48,795	2,399	4.92

The principal hindrance to the recruitment of even more gifted students to special programmes, particulatly those leading, early on, to training in re-

search, is the reluctance of many candidates to separate themselves from their fellow students and to sacrifice the camarderie of large classes for the solitude of individual study plans. The problem has become particularly acute in the case of education students who are aspiring to become primary and secondary level teachers. Measures are being taken to attract gifted students into those areas of educational research relevant to the levels of teaching in question.

In general, the study plans of gifted students adhere to the following pattern which consists of three stages:

Stage I. Study assignments, immediately following university enrollment, designed to demonstrate the talents of talented and gifted students.

Stage II. At their request, gifted students are assigned to groups of gifted students having similar interests.

Stage III. Accomplishment of specific research projects — development of individual students research profiles.

Priority of initial selection is given to students who have won distinctions in the secondary school level olympiads, have undertaken successful research projects, or who have been able to invent something. Most gifted students are formally selected for special studies during their first or second years of university studies. Some are selected as late as their third years. Some students undergo special testing so as to identify their gifts and talents with the greatest accuracy. Although the general academic averages of students are stressed, these can be waived in favour of scores in specific subjects or disciplines if the students in question display very exceptional talent for the subjects or disciplines in question.

Tables 2 and 3 summarize the criteria for the identification of talented students and their assignment to special programmes:

Table 2

The Preliminary and Broad Selection of Talented Students upon University Admission

Selection Criteria	Means of Evaluation
1. Outstanding grades and results in secondary school studies, particularly in profile subjects	Final secondary school grades; results in subject olympiads, secondary school research activity, innovative proposals
2. Clear interest in a selected area of study	Comprehensive secondary school evaluation; results in university entrance examination
3. Superior intellectual abilities	Comprehensive secondary school evaluation; I.Q. test results
4. Excellent results in university entrance examination	Complementary oral examinations
5. Social engagement	Evaluation of activities in the Socialist Youth Union

Table 3

The Further Selection and Assignment of Gifted Fourth Term Students to Individual Study Plans

Selection Criteria	Means of Evaluation
1. Superior grades	Study results during the first four terms of university study
2. Superior creativity; superior abilities to think creatively, and superior organizational and managerial abilities	Evaluations by teachers; results of special tests
3. Positive features of character	Evaluations by teachers
4. Superior motor abilities	Special tests
5. Personal interest of the student in creative activity	Evaluation of student research activity; role in student research clubs; participation in departmental research activities
6. Social engagement	Evaluation of political and social activities in the Socialist Youth Union

Gifted students serve as role models vis-à-vis the whole student body. As such they can be of particular help to the teaching staff. Of course, universities must guard against the development of unsociable elitism in their talented students. Still, it is in everyone's interest that the whole educational establishment stress the identification and the training of talented students.

3. Recommendations for University with Regard to Talented and Gifted Students

Work with talented and gifted students is a major task for universities. It not only requires great effort, but it requires that given teachers have superior professional qualifications. The standard of the organization of instruction is important as is the methodology employed, but what is of greatest importance is the concrete and purposeful direction of the work of students. The following recommendations are offered:

— close co-operation with secondary schools for the early identification of talented students; greater use of universities in the preparation of teaching materials for use in secondary schools;

— encouragement of research activities, olympiads, and other types of intellectual group activities among secondary school students so as to identify and to develop talent;

— offering of university-level introductory courses in secondary school in order to identify and to stimulate talented students;

— assignment of the best teachers to work with particularly talented students;

— early assignment of talented students to research units, particularly to those concerned with projects of major pedagogical value;

— organization in relevant subject areas of courses on "Rudiments of Research Work";

— invitations to talented students to attend special lectures, seminars, conferences, etc.;

— special visits of talented students to research centers;

— special foreign language training;

— early study and work to reach the level of doctoral entrance examinations and to produce scholarly writing;

— careful placement of talented graduates into employment assignments in which they can best use their training and their talents;

— special care for the political/ideological education of talented students so as to develop positive moral features, particularly a taste for hard work.

In short, the higher education system of the Czechoslovak Socialist Republic provides a wide scope for the training of talented and gifted students. The latter are encouraged to be creative in such ways that their universities and society as a whole may benefit from their creativity. Success in this venture depends on faculty members as well as on university administrators who never lose sight of the fact that one of the quality measures of a university system is its success in educating highly gifted and talented students.

Information

UNIVERSITY NEWS IN A EUROPEAN PERSPECTIVE

(Viterbo, Italy, 11-14 November, 1987)

The Problem

The proliferation of educational journals in the world today, particularly in the Europe Region including North America, is indicative of the intellectual fertility of scholarship in the educational sciences and in other related disciplines which deal with various aspects of higher education. At the same time, and probably to a greated degree, this proliferation must be attributed to the growing awareness of large sections of public opinion about the increasing role played by education in the development of nations.

A List of Periodicals dealing exclusively or preponderantly with educational matters, which was compiled in 1980 by the Documentation Centre of the International Bureau of Education in Geneva, included 571 periodicals produced in the countries of the Europe Region. An additional 13 periodicals published by various international organizations were also included in the list. A more recent count is offered by the *Contents Page in Education*, a computer-based international awareness service provided by Carfax Information Systems, listing the contents of over 600 of the world's education journals. The figures offered by the two reference publications do not completely reflect the present-day educational output, since some of the periodicals published in less known languages are neglected primarily because of linguistic barriers. But they serve as an indicator of the fact that educational periodicals have simply mushroomed during the last few decades.

What is the situation of periodicals devoted to higher education? As expected, their number is much smaller: about 20 according to the *IBE List* and 23 according to the *Contents Pages*. CEPES has examined the publications to which it has access and has come out with a larger number, namely 56, for the Europe Region alone. In an advertising sheet, circulated recently by the International Association of Universities (IAU), the claim is made that the Association regularly receives some 300 periodicals concerned with higher

* This report is based on a synthesis of two papers, one, a contribution to the meeting, prepared by D. Chiţoran, Director a.i. of CEPES, and the other, the final report, by Professor Jan Sperna-Weiland of the Netherlands.

education. Of the 56 journals identified by CEPES, 44 have been retained for presentation in a *Survey of Higher Education Periodicals* in which basic information of their affiliation, editorial policy, contents as well as other technical details are provided.

Probably all of the journals in question are facing a situation which reguires them to do a great deal with very scarce resources. Nevertheless, they frequently duplicate their efforts, doing separately what they might have been doing together to an extent not justified even by a very liberal acceptance of diversity.

The Meeting

To explore possible areas of co-operation among journals on higher education in the Europe Region, a meeting of editors of such journals, the first of its kind, was held in Viterbo, Italy, at the University of Tuscia, from 11 to 14 November, 1987. It was sponsored jointly by CEPES, the Standing Conference of Rectors, Presidents and Vice-Chancellors of European Universities (CRE), by the Istituto per la Cooperazione Universitaria (ICU) of Rome, Italy, and by the Italian journal, *Universitas*. A total of 27 participants attended representing 22 journals and organizations devoted to the diffusion of information on higher education.

The debates of the meeting brought into relief the great diversity of periodicals — both national and international — on higher education in the Europe Region (ranging from general higher education journals, to specialized scholarly reviews and information bulletins). This diversity was stressed as being a great asset which should be preserved in order to permit the journals to best perform the diverse functions which they are called upon to accomplish for the higher education communities of the countries of the Europe Region. At the same time, this very diversity leads to the necessity of devising modalities of co-operation and exchange of information among periodicals. It is only through such cooperation that they can keep national academic communities abreast of international trends and developments while, at the same time, providing up-to-date information and encouraging scholarly debate on national systems of higher education.

Indeed, the first recommendation made by the participants in the Viterbo meeting was for a network of co-operating journals to exist on a non-compulsory, voluntary, informal basis, taking the form of bilateral and/or multilateral arrangements for mutual benefit. One of the working groups characterized the proposed network as a "club of friends"; the other, prosaically, simply called it a "network". Both groups stressed the fact that in this network each individual journal would remain free in its relation to the others and to the network as a whole even if a certain degree of commitment were required

Certain small steps towards the establishment of the network were outlined as follows:

The respective journals were called upon to publish reports of the meeting, to which would be added a short description of some of the journals. Each journal was called upon to make its contents immediately available to all the others. The simple exchange of publications did not seem to be the best solution. What was suggested instead was that the respective journals assist one another

by the writing of short summaries of their respective articles of some ten or twelve lines apiece, by the addition of a few key-words or "descriptors", and finally by the compilation of reliable indexes.

The non-commercial journals were called upon to provide free publicity by inserting tables of contents, short summaries, etc., so as to render a service not only to the other journals but also to their own readership. Non-commercial journals could provide this service more easily than the commercial ones because for them the rigours of competition are attenuated. If, contrary to what was felt to be the case, some competition should indeed occur, it might be an incentive for some journals — or for all of them — to improve their end products.

As an important feature of co-operation, the editors of each journal agreed to announce in advance to one another their respective publication plans for the coming one or two years. The assumption was that information given in advance would result in some form of co-operation among given journals in the preparation of their publications. Each journal has limited resources for research purposes, and it is precisely in this area that they not only can assist one another but also improve upon what they are presently doing.

It would then be the task of the editors to help each other to find the right authors for certain well-defined subjects and to draw attention to specific authors and articles which might be of common interest. Working together, they should look for new talent, for an important problem is linked to the fact that, while there are many journals of higher education in Europe, there is a scarcity of authors who know how to write a readable article.

The participants also discussed the possibility of joint issues of different journals. Here, clearly, there was some hesitation. They all agreed, however, that "joint research" should be encouraged and came to the conclusion that both ideas needed to be further explored.

Finally, the idea of publishing a yearbook, containing some twenty of the best articles from a variety of journals on higher education in Europe, was raised. Some of the participants believed that there would be a market for such a book in the United States, in Latin America, in Japan, possibly in the Third World, and perhaps even in Europe, where industrialists for instance might well be interested in what is going on in the world of higher education.

Both working groups were of the opinion that there should be some coordination, without however encroaching upon the freedom of all the journals concerned. At least the network would need to have an address, a small and unpretentious centre somewhere in Europe in which some work might be carried out. Copies of correspondence on bilateral and/or multilateral contacts would be sent to this centre, which on the basis of this information would communicate what is going on and coordinate or initiate activities. A small working group would be needed to prepare the conditions for establishing such a centre.

Having this purpose in mind, CEPES intends to organize, in 1989, a follow-up conference to the Viterbo meeting. It is hoped the editors of a larger number of journals will meet and discuss problems of common interest. They will certainly have the benefit of the positive experience gained in co-operation along the lines outlined at Viterbo.

SEVENTH CONSULTATION OF LIAISON OFFICERS OF THE EUROPEAN CENTRE FOR HIGHER EDUCATION*

(Pécs, Hungary, 14—17 December, 1987)

CEPES held its Seventh Meeting of Liaison Officers in Pécs, Hungary, from 14 to 17 December 1987, on the invitation of the Hungarian Ministry of Culture and Education and of Janus Pannonius University in Pécs.

The discussions were structured around the three primary areas of the Centre's work, namely: a) co-operation and liaison, including the work related to the Convention on the Recognition of Studies, Diplomas and Degrees concerning Higher Education in the States belonging to the Europe Region, b) its role as a documentation, information and referral centre on higher education, and c) its role in promoting the study of and research on higher education.

1. Co-operation and Liaison

The discussion began by centering on the continuing efforts of CEPES to promote co-operation and liaison among Member States. As several Liaison Officers attended some of the thematic conferences, workshops, and other meetings organized over the 1986—1987 period which were the objects of discussion, their comments and critical evaluations were sought. The Liaison Officers repeatedly expressed their appreciation not only for the opportunities these meetings provide for direct exchanges between colleagues and researchers from other Member States but also for the important documents and reports to which they have given rise.

Particularly noted for their valuable results and follow-up activities were the *International Seminar on Problems in Comparing Studies, Diplomas, and Degrees on Higher Education* which was organized in Leipzig, GDR, in July 1986 and the regional Seminar on *Recent Trends in Research on Higher Education*, which took place in Salamanca, Spain, in October, 1986. New initiatives, such as the first *Training Workshop for Young Academics Doing Research on Higher Education*, received strong support from participants.

Several participants underlined the fact that during this time of change in higher education, the work of CEPES is a valuable contribution to the diffusion and the sharing of information among Member States. As new issues, such as new information technologies in higher education, lifelong learning, and relations between universities and industry are addressed, collaboration and co-operation are extremely useful.

* This account is a revised and shortened version of the Summary of Discussions of the meeting.

Success in the organization of meetings, seminars, and workshops has led CEPES to elaborate plans for the organization of similar activities in 1988—1989 and to respond to the initiatives in this respect of various Member States. The Liaison Officers were informed about the tasks which the Centre will assume in preparation for the 4th Conference of Ministers of Education of the Europe Region as well as for the 41st session of the International Conference on Education focussing on the *Diversification of Post-Secondary Education in Relation to Employment*, to be held in 1989. They discussed several other projects for meetings and conferences and made concrete proposals for their implementation. Notably, the representative of the GDR expressed a keen interest in hosting a meeting on the *Relationship between Universities and Industry*.

The Union of Universities of Yugoslavia proposed to organize jointly with CEPES, within the framework of the International Seminar "University Today", an experts' meeting of university representatives on a topic of common interest. Another suggestion concerned the proposed seminar or symposium on *The Application of Recent Developments in Research on Natural and Artificial Intelligence to Higher Education.*

Within the framework of an evaluation of university studies, the Greek Ministry of Education and institutions of higher education of that country have expressed their desire to organize, together with an international organization and with the strong participation of universities from various countries in the Region, an international colloquium on the "Organization of the Contemporary University".

Participants also commented on the importance of and interest in meetings on other topics, especially the proposed seminar entitled *Universities as Centres of Lifelong Education.*

2. Convention on the Recognition of Studies, Diplomas and Degrees in Higher Education

The Liaison Officers gave a positive appreciation of the many-sided activities undertaken by CEPES with regard to its role as the Secretariat of the Convention. They underlined in particular the importance of the co-operation relations established with the other regional and international organizations which are active in the field of recognition of studies, diplomas, and degrees: the Council of Europe, the European Economic Community, the Council of Mutual Economic Assistance of the socialist countries, etc.

3. Documentation, Information, Research, and Publications

Several spheres referred to the function of CEPES as a documentation and information centre. They appreciated the steps taken by the Centre towards becoming a unique source of documentation. Its library has continued to expand and to be modernized. The computerization of the current holdings aided by the use of the Unesco CDS/ISIS software programme have created an easily accessible data bank of publications, conference proceedings, and major periodicals in the area of higher education. Co-operation with other countries has continued.

The CEPES staff informed the Liaison Officers of their intentions to reinforce the Centre as a major and dynamic source of information and documentation in Europe. In their efforts to maintain and to develop the two main types of data bases already in existence, one bibliographical and the other institutional, they called upon the Liaison Officers to become more active collaborators in this work.

The meeting praised the various studies prepared by CEPES in collaboration with individual researchers from other organizations. Of particular note were the up-dated version of the *International Directory of Research Institutions on Higher Education*, the statistical study on *Higher Education and Research in Europe (1980—1985)*, as well as the study on the *Introduction of New Information Technologies in Higher Education* which are currently being prepared for publication.

Marking 1986 as the International Year of peace, a major project was undertaken consisting of the collection of information about the educational and research programmes of higher education institutions devoted to international co-operation, understanding, peace, and respect for human rights and fundamental freedoms. The recommendation made was that CEPES assure a wide distribution of the study which will soon be published.

The Liaison Officers noted with satisfaction that work on the long-term study on the Terminology of Higher Education in the Europe Region is proceeding well. Those present received samples of those parts of the *Lexicon of Higher Education in Europe* concerning their respective countries for verification and revision.

A fruitful discussion centered around one of the projected studies, namely that on the *Doctorate in the Europe Region.* While many constructive comments were made as to how best to make this a useful source of information for Member States, questions with regard to its descriptive and/or evaluative nature were raised. Additionally, Liaison Officers underlined the importance of co-operation with other organizations already working on similar studies. They also stressed that as lack of information is the primary difficulty in this area, Member States need to play an active role. Finally, similar studies were cited with the hope that they would be examined.

The Liaison Officers encouraged the editors of *Higher Education in Europe* to pursue the Centre's objectives of raising its qualitative contents so as to secure its standing in a highly competitive world of publications of similar nature. They agreed, in principle, with the topics to be featured in up-coming issues as listed in the Working Document. They also agreed that the review should constantly strive to reflect the issues of greatest importance in research on higher education. A suggestion was made to focus a future issue of *Higher Education in Europe* on the theme "Higher Education Developments within the Perspective of the 21st Century".

One of the Liaison Officers requested that in the case of articles which are submitted to the review but cannot be published, a brief bibliographical reference be listed in order to inform the readers of their availability in the CEPES documentation collection.

The future of the *monograph series on European higher education systems* was discussed at length. It was noted with satisfaction that during the next two years several manuscripts will be submitted for publication. A draft of the Finnish manuscript was turned in during the meeting. The respective

Liaison Officers informed the meeting that the manuscripts of the following countries are in stages of near completion or are under preparation: *Greece, the Netherlands* (revised version of published monograph), *Sweden, the USSR, Yugoslavia, Spain, Italy,* and *Israel.*

Issues, such as the up-dating of the existing monographs, considerations for publication in a dynamic format, matters related to the publication mechanism, and co-operation with other organizations were all examined as solutions to the problem of a more concrete publication schedule. Countries which have already published their monographs underlined the usefulness of the latter in their own countries as well as abroad.

4. Reflections on the Future Role of CEPES

During more general discussions on the future programme of CEPES, several comments of a more reflective nature were made. The Liaison Officers expressed appreciation for the work of CEPES and the scope of activities foreseen in the Centre's efforts to stimulate and to promote echanges, co-operation, and the sharing of ideas among experts and institutions of Member States. Under current circumstances, however, some felt that it might be worthwhile to consider a more concentrated approach. Moreover, as several organizations in Europe work in similar areas, greater collaboration is desirable.

The future work of CEPES was thus the subject of a lively and fruitful debate among all participants. Moreover, the need to discuss trends and developments in higher education with regard to the 3rd Medium Term Plan of Unesco was acknowledged. Participants were strongly urged to express their views on these matters to their national Commissions for Unesco and to write, as soon as possible, to CEPES expressing their suggestions and recommendations for the role of CEPES with regard to that Plan.

IMPROVING CO-OPERATION BETWEEN EUROPEAN AND AFRICAN UNIVERSITIES IN THE FIELDS OF TEACHING, RESEARCH, AND INTER-UNIVERSITY CO-OPERATION PROCEDURES [1]

The following survey provides a brief summary: 1) of the background 2) of the main aims and participants, 3) of the procedures and the main results, and 4) of the follow-up activities of an international symposium with 30 participants from 8 European and 5 African countries. It was organized jointly by B. Berendt of the Freie Universität Berlin (organizing director), M. Debeauvais of the University of Paris VIII, N. Svob-Dokić of the University of Zagreb, and N. S. Agblemagnon of the Laboratoire Africain de Co-ordination de Recherche.

The symposium was initiated and organized as a follow-up activity to the colloquium, "L'Éducation et le nouvel ordre économique international" (organized by the universities of Zagreb and Paris VIII in Dubrovnik in September, 1984) and the congress, "Higher Education by the Year 2000" (organized by the European Association for Research and Development in Higher Education — EARDHE — in Frankfurt in September 1983).

A publication about the conclusions and the recommendations of the four working groups of the symposium as well as detailed working papers may be ordered from the organizing director [2].

1. Background

A number of bilateral and multilateral programmes as well as exchanges of persons (e.g. African students at European universities and European university teachers and researchers at African universities) link European and African universities. The procedures and the financial support for these exchanges differ.

African students and staff members have, of late, been developing a critical attitude towards the dominance of European universities in the programmes and the exchanges. They are particularly concerned by the fact that the context of many study programmes does not pay adequate attention to the specific needs and conditions of development within African countries. During several national and international conferences, experience gained was ana-

[1] This report is based on the final document of the International Symposium in question, held at the Interuniversity Centre of Dubrovnik, Yugoslavia, from 21 to 26 September, 1987. It was written by Dr. Brigitte Berendt, the rapporteur of the symposium, and one of its co-organizers.

[2] Address: Dr. B. Berendt, Head of the Unit for Staff Development and Research into Higher Education, Freie Universität Berlin, Habelschwerdter Allee 34 a, D-1000 Berlin 33.

lyzed, and recommendations were formulated in order to improve the different forms of exchange as well as to develop approaches to the solution of problems [3]. Most of these conferences, however, were initiated by governmental institutions or by sponsoring agencies, not by universities. Their principal aims were not necessarily the promotion of direct exchanges among university members.

2. Principal Aims and Participants

The principal aims were the exchange of experiences in different fields of co-operation, the identification of typical problems, and the development of approaches to the solution of problems. The symposium was planned primarily for university members with practical experience as teachers, researchers, and administrators.

Thanks to financial support offered by the Commission of the European Communities, two key participants were able to attend: J. Bukhala (United Nations Commission for Africa) and W. J. Kamba (Vice-chancellor, University of Zimbabwe). It was fruitful, that K. Adamou N'Diaye (Université de Benin), present at the time of the symposium at the University of Wageningen, and that G. Niyimbonera (now at the University of Zagreb) could both attend.

3. Procedures and Main Results

The programme provided for a morning session each day featuring a contribution by an African colleague, followed by group work on the following topics:

a) teaching and learning in African universities — staff development programmes as a field of co-operation;

b) teaching and learning in European universities;

c) research about and in Africa;

d) inter-university co-operation procedures.

At the end of the Symposium, the co-ordinators or representatives of groups presented their main issues and their conclusions or recommendations.

3.1. *Plenary Session Presentations*

Agblemagnon reported on his activities in the field of research and particularly on his activities in the "Laboratoire Africain de Coordination de Recherche et d'Études Interdisciplinaires". He summarized parts of a working paper concerning status and roles and expectations of partners in inter-university co-operation, provided examples concerning research in Africa, and made suggestions for future co-operation. He finished by analyzing certain major problems of research in Africa.

In his contribution, *Kamba* stressed his view that the world is a "global village" and that universities are "universal and unique" at the same time.

[3] E.g. "Promotion of Research oriented Education and Training at African Universities", International Conference by DSE, GTZ, DAAD held in Nairobi in September, 1985. Details: R. Schlette and W. Schmeling, Vol. I and II — DSE Dok. 1336 A/a, B.

He warned against speaking about "The African university" and emphasized the necessity of co-operation between African and European individuals as equals. Co-operation should lead to a linkage of mutual benefit in the context of a new economic order. He identified staff (faculty) development for improving teaching and learning, and co-operation in research and in the improvement of library equipment as important fields of interuniversity co-operation. Kamba ended by describing already existing links between the University of Zimbabwe with northern and southern universities.

He identified five general principles that govern such agreements "in order to protect our interests": "The linkage is deemed to be positively (and) mutually beneficial . . ., does not seek to perpetuate a dependency . . ., does not conflict with the policies of the countries in which the universities are situated . . . promotes a healthy interaction . . ., is in the interests of academic excellence, human welfare and development, technological development and transfer, and for international understanding."

Adamou N'Diaye drew attention to the "Lagos Plan of Action for the Economic Development of Africa 1980—2000". It views agriculture as the basis for economic development with the aim of self-sufficiency and self-reliance. He gave a detailed description about the close co-operation between his university and the African universities of Abidjan, Togo, Brazzaville, Senegal, and Ethiopia and European universities in Belgium, Italy, and France. Co-operation with the Agricultural University of Wageningen (The Netherlands) seems to demonstrate how links between an African and a European university can lead to "mutual benefit" as called for by Kamba.

Bukhala focussed on the theme, "from dependency to interdependency" and took the European-African project "Improving Teaching and Learning in African Universities", sponsored by the German Foundation for International Development (DSE) as an example. In this context, he organized workshops together with European colleagues, from 1981—1986, for staff development in higher education at different African universities. After a certain European dominance at the beginning, important African key persons (e.g. Vice-Chancellors) were involved. They are now designing future activities as a result of a conference organized jointly by German donor agencies (DSE, DAAD, GTZ) to which representatives of different European donor agencies have been invited.

3.2. *Principal Results of the Group Work*

Group 1: Ever since the "Lagos Plan of Action" was formulated, representatives of African universities have been discussing the necessity of improving teaching and learning at their universities by the provision of in-service training for teaching staff members (so-called "staff development programmes"). In 1985, the Conference of Vice-Chancellors, Presidents, and Rectors of Institutions of Higher Learning in Africa [4] discussed the paper "Re-orientation and Adjustment in University Functions for Responsiveness". As a result, the participants recommended the establishment of staff development

[4] Economic Commission for Africa: Re-orientation and adjustments in University functions for responsiveness. Paper presented at the Second ECA-AAU Conference of Vice-Chancellors, Presidents, and Rectors of Institutions of Higher Learning in Africa. Mbabane, February, 1985.

units and/or committees for improving teaching and learning in African universities. Another conference held in 1987 repeated this recommendation.

The consensus within the group was that European-African staff development programmes should include a cross-cultural dialogue. Short-term activities were seen as a starting point towards organizational development efforts with long-term effects. Staff development programmes should therefore not only include individual teachers but key persons (Vice-Chancellors, administrators, etc.). The group developed detailed recommendations about activities, possible content areas, basic principles, and about co-operation in the field of staff development.

Group 2: After identifying different models of enrollment for African students, the group called for discussions about the criteria for admission and eventually for the establishment of internationally recognized criteria so as to facilitate the preparation of African students and to permit comparisons. Co-operative agreements on fellowships and acceptance should stipulate the obligations of African countries to maintain contacts with their students (enabling them to spend some time at home, monitoring their successes or failures etc.). African universities should endeavour to keep abreast of development projects within their countries so as to provide relevant case studies for university teachers and students.

Group 3: On the basis of experience gained so far, the group set up criteria for co-operative research programmes and additionally recommended the immediate establishment of an inventory of co-operative projects.

Group 4: The group argued that the domain of co-operation not only includes questions of finance but also the choice of partners and the formulation of projects. The improvement of co-operation requires that its aims and the philosophy behind it be clarified. The task might require the renegotiation of the terms of co-operation and the clarification of real needs. In many cases, bureaucracy hinders fruitful co-operation. Its influence should therefore be reduced or modified. The evaluation of co-operative projects should be a formative experience and should involve European and African partners: "Handing over" should be planned in a careful way.

4. Followup Activities

In the final discussions, the participants expressed their positive feelings about attempts to start a direct dialogue between university members. They expressed a wish to continue the dialogue in two years (perhaps with more specific sub-topics). They hoped, however, that, at the next conference scheduled for 1989, more African participants might be able to attend. They were also of the opinion that it would be even more fruitful if a larger number of representatives of donor agencies and international organizations could participate.

Calendar of Events

MEETINGS ORGANIZED BY CEPES

For further information concerning these meetings, contact: European Centre for Higher Education (CEPES), 39 Ştirbei Vodă Street, Bucharest, Romania

5—7 September

14th Meeting of the Advisory Committee of CEPES (Bucharest, Romania)

26 September

Consultation of National Information Bodies for Recognition of Studies and Mobility of Persons in Higher Education (in conjunction with the 4th Session of the Regional Committee) (Bucharest, Romania)

27—29 September

4th Session of the Regional Committee for the Application of the Convention on the Recognition of Studies, Diplomas and Degrees concerning Higher Education in the States belonging to the Europe Region (Bucharest, Romania)

1989

February

Symposium on "The Advent of Artificial Intelligence in Higher Education" (Bucharest, Romania)

Late Spring

Regional Seminar on "Higher Education Institutions as Centres of Lifelong Education"

June

8th Consultation of Liaison Officers of CEPES (Bucharest, Romania)

Autumn

International Symposium on "The Relationship of Higher Education with Industry" (Kottbus, German Democratic Republic)

September

Meeting of Editors of Higher Education Journals (Bucharest, Romania)

OTHER MEETINGS

1988

5—8 April

6th Higher Education International Conference "Vocational Training in Higher Education"
Jointly organised by Higher Education International and the Universidade do Porto, Portugal
(Braga, Portugal)
For further information, contact; Martine Neave, Higher Education International, 344-354 Gray's Inn Road, London WC1X 8BP, United Kingdom

21—22 April

"University Graduates: the Quantity/Quality Dilemma"

Bi-annual Conference of the CRE
(Würzburg, FRG)
For further information, contact: CRE, 10, Conseil Général, CH-1211 Geneva 4, Switzerland

25 April — 24 June

Staff Development in Higher Education
A 9-week course for senior academic staff educational administrators and individuals involved in academic staff development
(Guildford, United Kingdom)
For further information, contact: Centre for the Advancement of Teaching in Higher Education, University of Surrey, Guildford, Surrey GU2 5XH, United Kingdom

27 — 28 April

Alternation in Higher Education. European Practices and Prospects
(Lille, France)
For further information, contact: Mrs. Sylvie Cottini-Wadoux, ADMES Scientific Secretariat, c/o BIP-CEFI, 58 rue de Lisbonne, 75008 Paris, France

4—6 May

7th Annual Conference of the Canadian Association for the Study of Adult Education
(Calgary, Alberta, Canada)
For further information, contact: Ms. Madeleine Aldridge, The Conference Office, University of Calgary, 2500 University Drive, N.W., Calgary, Canada

6—[illegible] May

29th Annual Conference of the Adult Education Research Conference
(Calgary, Alberta, Canada)
For further information, contact: Ms. Madeleine Aldridge, The Conference Office, University of Calgary, 2500 University Drive, N.W. Calgary, Canada

10—15 May

3rd Annual Conference of the Commonwealth Association for the Education and Training of Adults
(Medicine Hat, Alberta, Canada)
For further information, contact: Ms. Madeleine Aldridge, The Conference Office, University of Calgary, 2500 University Drive, N.W., Calgary, Canada

23—26 May

International Congress "The Pedagogical Challenge of Higher Education"
(Montréal, Canada)
For further information, contact: Denis Blondin, Congres A.I.P.U., Service pédagogique, Université de Montréal, C.P. 6128, succursale A Montréal, (Québec) H3C 3J7, Canada

1—3 June

"New Directions in Higher Education: a Role for the Community?"
Canadian Society for the Study of Higher Education (CSHE)
(Windsor, Canada)
For further information, contact: Teresa Karolewski, George Brawn College, P.O. Box 1015, Station B, Toronto (Ontario) Canada M5T 2T9

15—18 June

"The University as a Melting Pot of European Culture"
(Warsaw, Poland)
For further information, contact: CRE, 10, Conseil Général, CH-1211 Geneva 4, Switzerland

20—23 June

"Improving University Teaching"
14th International Conference
(Umeå, Sweden)
For further information, contact: Improving University Teaching, The University of Maryland, University College, University Boulevard at Adelphi Road, College Park, Maryland 20742, USA

20—24 June

"Successful College Teaching" 7th International Seminar on Staff, Programme, and Organizational Development
(Witzenhausen, FRG)

For further information, contact: International Seminar on Successful College Teaching, Prof. Dr. F. H. Riebel, Faculty of International Agriculture, University of Kassel, D-3430 Witzenhausen, FRG

27 June—1 July

1st International Conference on Successful College and University Administration
(Newcastle, United Kingdom)
For further information, contact: Dr. Al Smith, International Conference on Successful College Administration, Division of Continuing Education, 2207 N.W., 13th Street, Gainesville, Florida 32609-3476, USA

June

Meeting of Experts in Europe on "New Developments in the Training of Educational Personnel with Particular Attention to the Cultural Aspects of Training"
(Prague, Czechoslovakia)
For further information, contact: V. Goryatchev, Unesco, ED/HEP, 7 place de Fontenoy, 75700 Paris, France

June

Round Table "Education Today Faces the XXI Century"
For further information, contact: H. Marchal, Unesco, ED/SCM, 7 place de Fontenoy, 75700 Paris, France

1—6 July

Seminar for Newly Elected University Administrators.
Organized jointly by CRE and the Programme for Institutional Management of Higher Education (IMHE) of OECD.
(Cork, Ireland)
For further information, contact: CRE, 10, Conseil Général, CH-1211 Geneva 4, Switzerland

27 July—10 August

30th London International Youth Science Fortnight
(London, United Kingdom)
For further information, contact: London International Youth Science Fortnight, PO Box 159, London SW10 9QX, United Kingdom

1—5 August

"International University Co-operation, a Critical Analysis: Failures, Success, Perspectives" Mid-Term General Conference of the International Association of Universities (IAU)
(Rio de Janeiro, Brazil)
For further information, contact: D. Allen, IAU, 1 rue Miollis, 75732 Paris, CEDEX 15, France

8—12 August

Conference on "Promoting Ethics, Values and Interdisciplinarity in Higher Education"
(Cambridge, England)
For further information, contact: Prof. S. J. Paolini, Alaska Pacific University, 4101 University Drive Anchorage, Alaska 99508, USA

10—17 August

14th World Conference "Developing Distance Education"
(Oslo, Norway)
For further information, contact: ICDE Conference Office, Markveien 35 B, P. O. Box 2100, Grunerlokka, N-0505 Oslo 5, Norway

14—18 August

13th International Conference for the Advancement of Counselling (IRTAC)
(Calgary, Alberta, Canada)
For further information, contact: Dr. S. Robertson, Dept. of Educational Psychology, The University of Calgary, Calgary, Alberta, Canada T2N 1N4

15—19 August

"Visions of Higher Education: Transnational Dialogue: Social Responsibility in Higher Education" 4th International Conference on the Future of Higher Education

(Turku, Finland)
For further information, contact: Dr. Rolf Homann, Head of the Unit for Culture and Society, Gottlieb Duttweiler Institute, Langhaldenstrasse 21, CH-8803, Rüschlikon, Switzerland

30 August—2 September

SEFI Annual Conference "Engineering Education in Europe 1988"
(Leuven, Belgium)
For further information, contact: SEFI Conference 1988, Local Organizing Committee, Katholieke Universiteit Leuven, Celestijnenlaan 200A, B-3030 Leuven, Belgium

12—14 September

Social and Cultural Innovation in a Technological World: The Culture Politics and Political Culture of the Future
(Rüschlikon, Switzerland)
For further information, contact: Dr. Rolf Homann, Head of the Unit for Culture and Society, Gottlieb Duttweiler Institute, Langhaldenstrasse 21, CH-8803, Rüschlikon, Switzerland

16—17 September

"The Changing Functions of the University"
Bi-annual Conference of the CRE
(*Bologna, Italy*)
For further information, contact: CRE, 10, Conseil Général, CH-1211 Geneva 4, Switzerland

21—27 September

4th Conference of Ministers of Education of Member States of the Europe Region, (MINEDEUROPE IV)
(Headquarters of UNESCO, Paris, France)
For further information, contact: Unesco, Director ED/EPP, 7 place de Fontenoy, 75700 Paris, France

11—14 October

5th All-European Conference of Directors of Educational Research Institutions 'Effectiveness of In-service Education and Training of Teachers and School Leaders"
(Triesenberg, Liechtenstein)
For further information, contact: Mr Michael Vorbeck, Head of the Section for Education Research and Documentation, Council of Europe, BP 431 R6, 67006 Strasbourg Cedex, France

11—14 October

4th Session of the Conference of Rectors of Balkan Universities (CRUB)
(Bucharest, Romania)
For further information, contact: The Rector, University of Bucharest, 64, Blvd. Gheorghe Gheorghiu-Dej, Bucharest Romania

October

Meeting of Universities of Countries of Mediterranean Europe
(Bordeaux, France)
For further information, contact: Mr. M. Vialard, 351 Cours de la Libération, 33405 Talence Cedex, France

17—19 October

European symposium on "The Role of Women in Higher Education, in Research, and in the Planning and Administration of Education"
For further information, contact: F. Nuovo, Unesco ED/SPO/FEM, 7 place de Fontenoy, 75700, Paris, France

17—22 October

16th Conference of Ministers of Higher Education of Socialist Countries
(Bucharest, Romania)

30 November—2 December

"Continuing Education of Engineers — Investment into the Future"
(Stuttgart, FRG)
For further information, contact: Prof. Dr. E. Golling, c/o Technische Akademie Esslingen, In den Anlagen 5, P.O. Box 1269, D-7302 Ostfildern, FRG

1989

9—17 January

41st Session of the International Conference on Education (ICE) "Diversification of Post-Secondary Education in Relation to Employment"
(Geneva, Switzerland)
For further information, contact: The Director, International Bureau of Education, P.O. Box 199, CH-1211 Geneva 20, Switzerland

18—19 May

"The Regional Relevance of Vocational Training"
Bi-annual Conference of the CRE
(Uppsala, Sweden)
For further information, contact: CRE, 10, Conseil Général, CH-1211 Geneva 4, Switzerland

11—15 September

"The University and the Community"
9th General Assembly of the CRE
(Durham, United Kingdom)
For further information, contact: CRE, 10, Conseil Général, CH-1211 Geneva 4, Switzerland

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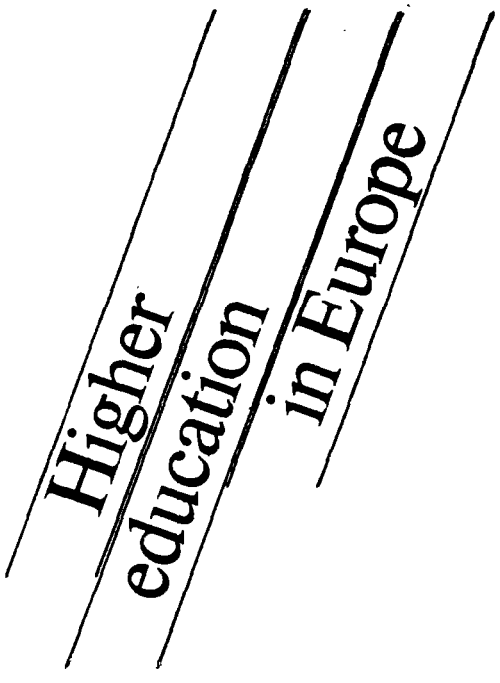

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