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INTERNATIONAL CONGRESS ON THE DEVELOPMENT AND IMPROVEMENT OF  
TECHNICAL AND VOCATIONAL EDUCATION

(Berlin, German Democratic Republic, 22 June - 1 July 1987)

FINAL REPORT

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## I. INTRODUCTION

### Opening Ceremony

1. The Congress was opened on Monday, 22 June 1987 by Mr. Werner Krolikowski, First Vice-Chairman of the Council of Ministers of the German Democratic Republic. Mr. Michel de Bonnecorse, Deputy Director-General of Unesco, welcomed participants on behalf of the Director-General.

2. In his address, Mr. Krolikowski stated that it was a mark of honour for the German Democratic Republic to have been chosen as the venue for the Congress, and an acknowledgement of its constructive co-operation with the United Nations Organization and its specialized agencies. He referred to the commemoration of Berlin's 750th anniversary and to the spirit of joy and optimism in which this event is being celebrated, in the presence of visitors from all parts of the world. This optimism is linked with the most important lesson drawn from German history - that no more war should emanate from German soil. Ever since its foundation, the German Democratic Republic has made the maintenance of peace the supreme tenet of its policy.

3. Speaking of technical and vocational education, Mr. Krolikowski referred to the fundamental rights to work and to education which are enshrined in the Constitution of the German Democratic Republic, which also lays down the right and duty of every young person to learn a trade or profession. He indicated that since the German Democratic Republic was founded in 1949, an enormous leap forward has been made in the training of skilled workers in industry, agriculture and other productive sectors of the economy. An efficient system of vocational education has been built up which is in complete harmony with the Revised Recommendation concerning Technical and Vocational Education adopted by Unesco in 1974. It forms an inseparable part of the integrated socialist education system, combining pre-school education, general education and vocational education together with university and technical college education. Vocational education encompasses general, polytechnical and vocational instruction. Equal opportunity for all children - irrespective of sex, ideology or social background as well as permeability of the educational streams and the optimum development of all pupils, apprentices and students are guaranteed by this system.

4. In welcoming participants, the Deputy Director-General of Unesco, Mr. de Bonnecorse, thanked the Government of the German Democratic Republic for hosting the Congress in Berlin. He said that this showed the priority given, by the Government, to technical and vocational education.

5. Mr. de Bonnecorse indicated that participation in the Congress is of high quality, comprising participants from many countries in all regions of the world, as well as United Nations institutions and international non-governmental and intergovernmental organizations. In reminding participants that this Congress is the first of its kind, he stated that it provides a unique opportunity to take stock of the present situation and to plan for the future. He indicated that, in comparing the status of technical and vocational education in one country and another, not only do training systems vary enormously, but there may be important differences in terminology. In each country a plurality of government ministries is involved and, at the international level not only Unesco, but also ILO, UNIDO, FAO and WHO all

have a part to play. Unesco's work in the field of technical and vocational education among other things has focused on key personnel such as planners, teacher trainers, inspectors and administrators and is particularly directed to in-service and pre-service teacher training, qualitative improvements and modernization of equipment, laboratories and workshops. During the past five years, Unesco has co-operated with more than 55 Member States and, with extra-budgetary resources, has operated about 50 projects at a cost of 45 million dollars.

6. In conclusion, Mr. de Bonnecorse stated that if the expansion and modernization of technical and vocational education are a concern shared by countries in all parts of the world, this is an area where international co-operation assumes particular importance. The proceedings and conclusions of the Congress will be published by Unesco, and diffused throughout the world. They will be studied by the Director-General with a view to drawing on them in the preparation of Unesco's next Medium-Term Plan which will define the action of the Organization during the last decade of the century.

#### The Work of the Congress

7. The meeting elected the following officers:

President	Dr. Helmut Oppermann Deputy Secretary of State State Secretariat for Vocational Education German Democratic Republic
Vice-Presidents	Mr. Peter Sacks Federal Ministry of Education and Science Federal Republic of Germany
	Mr. Jia Xueqian Deputy Secretary-General Chinese National Commission for Unesco
	Dr. Roberto Boclin Director National Service for Industrial Training Brazil
	Mr. Hussein Roshdy Ahmed Under-Secretary of State for Technical Education Ministry of Education Egypt
Rapporteur General	Mr. Q. M. Bhila Deputy Secretary, Education Development Ministry of Education Zimbabwe
Assistant Rapporteur General	Mr. Peter Holmberg Senior Administrative Officer Ministry of Education and Cultural Affairs Sweden

8. Mr. S.R. Samady, Director of the Division of Science, Technical and Environmental Education and Secretary-General of the Congress, explained the organization of the work. He outlined the themes that would be discussed in plenary sessions and in commissions and drew attention to the documentation for the Congress - especially to the Main Working Document.

9. The Congress then reviewed, in plenary session, major trends in technical and vocational education. This review was introduced by Mr. H. Unterbrunner, Unesco consultant. The second major theme, namely 'The role of technical and vocational education in national development', was then introduced in four parts. The first of these, 'The contribution of technical and vocational education to the democratization of education and social progress', was presented by Mr. B. Weidemann, State Secretary for Vocational Education, German Democratic Republic. In the ensuing discussion, nine speakers took part.

10. During the next two plenary sessions the three remaining sub-themes were presented. 'Technical and vocational education and human resources development' was introduced by Mr. G. Besner and Mrs. M. Kisanga, 'Increased participation of women in technical and vocational education' was presented by Mrs. M. Dentcheva and Mrs. F. Javed, and 'Implications of rapid scientific and technological progress for technical and vocational education' by Dr. H. Schmidt. Mr. J. Ngundam also spoke on the subject of 'The micro-electronic revolution and its consequences for the Third World'. These themes, as well as those presented in the previous plenary were discussed during these two sessions and in a further plenary session by 26 speakers.

11. The two commissions were established at the end of the morning session on Wednesday, 24 June. They started their work on the morning of Thursday, 25 June and completed it on Friday, 26 June. They discussed the third major theme of the Congress, namely 'Strategies for the improvement of technical and vocational education'. They covered the following topics and elected the following officers:

Commission I	Planning and administration of technical and vocational education
	Chairman Dr. T. Ogunbadejo (Nigeria)
	Vice-Chairman Prof. D. Donchev (Bulgaria)
	Rapporteur Mr. M. Hasbellaoui (Algeria)
Commission II	Innovations in content and methods of technical and vocational education
	Chairman Mr. G. Besner (Canada)
	Vice-Chairman Mrs. F. Javed (Pakistan)
	Rapporteur Dr. A. Sangster (Jamaica)

12. On Monday, 29 June, the fourth major theme, 'International co-operation for the development and improvement of technical and vocational education' was discussed in two plenary sessions.

13. Visits were organized, for the participants, to agricultural, chemical, mechanical and other technical and vocational education institutions.

14. The reports of the two commissions were discussed and adopted by the respective commissions on the afternoon of Tuesday, 30 June. The report of the Congress was adopted by the plenary on the morning of Wednesday, 1 July, when the closing ceremony was also held.

## II. REVIEW OF MAJOR TRENDS IN TECHNICAL AND VOCATIONAL EDUCATION

15. The first major theme for discussion, 'Review of major trends in technical and vocational education' (document ED-87/CONF.401/REP.4) was presented to the Congress by Mr. H. Unterbrunner, Unesco consultant, and several speakers took part in the ensuing discussion.

16. The quantitative expansion of technical and vocational education over the period 1970-1984 was noted; its annual growth rate worldwide represents 4.5 per cent, as compared with 3.9 per cent for general education. The growth rate of technical and vocational education in developing countries (7.1 per cent) was greater than in industrialized countries (3 per cent). These statistics, however, do not reflect enrolment in non-formal vocational education, which is especially significant in industrialized countries. The actual situation in developing countries is less favourable than these statistics indicate, as only a small percentage of the population has the possibility to enter secondary education and the total population growth in many countries counter-balances the increase of enrolment in education. Quantitative expansion of technical and vocational education has had a negative influence in a few cases where insufficient attention has been paid to the quality of instruction.

17. A major drawback for technical and vocational education in certain countries is its low status and insufficient training facilities to produce middle-level technical personnel. There is also a tendency towards over-production of higher-level personnel with the upgrading of technical schools and institutes leading to a disproportionate output in relation to real employment requirements for socio-economic development.

18. The last ten years have shown that progress has been made in policy formulation for technical and vocational education; many countries have adopted policy statements and reforms in this field, and a number consider that Unesco's Revised Recommendation concerning Technical and Vocational Education provides adequate guidelines in this connection.

19. Rapid technological progress and changes in the labour market have called for constant adjustment of the system and for closer co-operation between educational, economic and labour authorities. Planners of the development of human resources have improved their methods and continuous evaluation has provided better feedback.

20. It was noted that administrative structures have also considerably improved, and separate departments dealing with technical and vocational education within ministries of education have been created. In a number of countries, separate ministries, state committees or autonomous bodies have been established to take over the responsibility for technical and vocational education and training.

21. The high cost of technical and vocational education is an important concern, as is the need to strengthen links between this type of education and industry, which is expected to contribute in sharing the cost of training through provision of facilities, etc. New forms of co-operation between school and industry have been developed which facilitate the identification of possible workplaces for future graduates.

22. An important development has been the reform of general education to include technical elements in curricula as well as an increased orientation to active life. Such efforts, which have generally focused on young people aged 12-15 at lower-secondary level, have provided basic knowledge and skills and have encouraged positive attitudes towards technical and vocational careers.

23. Progress has been achieved in the improvement of educational structures, although barriers still exist to a large extent between general education and technical and vocational education, between technical and vocational education and vocational training and, in particular, between technical and vocational education and higher education. However, some countries have created open, more flexible systems to counteract this problem. Efforts should be made by more countries in these fields.

24. A number of achievements have been made in curriculum development through the use of modern methods, although there is a need for adaptation of different models of curricula to local situations. Lack of learning material has also hampered the quality of the teaching/learning process in some countries. Modern technology such as computers have been introduced into technical and vocational education during the last ten years and are increasingly being used in this field. Although priorities are being given to the requirements of the individual learner, more emphasis should be given to developing his creative abilities. The use of computers in technical and vocational education should take into account the increasing intellectual possibilities of the learner, solving pedagogical problems and elimination of possible negative effects on creative abilities, as well as the health of the learner. Emphasis should also be given to the aspects of general human values and the environment in technical and vocational education curricula.

25. The role of technical and vocational teachers and their training is a crucial issue. In this connection, it is very important for technical and vocational education teachers to possess high level qualifications to enable them to be involved in the organization and planning of their work in close co-ordination with economic developments. In some countries, an important problem is lower salaries of such teachers as compared with those of personnel in comparable positions in industry. The resulting loss of teaching personnel for technical and vocational education is considered a severe handicap. Rapid technological progress over recent years has called for an acceleration of in-service training to update and upgrade technical and vocational education teachers. New methods have been developed in the form of modular training to link in-service and pre-service training more closely together and to



increase cost-efficiency.

### III. THE ROLE OF TECHNICAL AND VOCATIONAL EDUCATION IN NATIONAL DEVELOPMENT

#### 1. The contribution of technical and vocational education to the democratization of education and social progress

26. This theme was covered by document ED-87/CONF.401/REF.3 and was introduced by Mr. B. Weidemann, State Secretary for Vocational Education of the German Democratic Republic. In his presentation, Mr. Weidemann summarized experience gained in his country in this field.

27. Mr. Weidemann informed the Congress that the Constitution of the German Democratic Republic guarantees the right to vocational education and to work for all citizens. The education system provides a ten-year compulsory poly-technical secondary education, followed by two to three years of vocational education. This integrated system of technical and vocational education provides students with a secondary certificate as well as a vocational certificate. A well-established vocational guidance system assists learners in secondary education courses in making appropriate choices as regards further education and training. Guidance services are thus considered an integral part of the education system. The Secretary of State also stated that the 1974 Unesco Revised Recommendation concerning Technical and Vocational Education is considered a highly useful document for policy formulation. He also summarized the development of further education in the German Democratic Republic as well as existing provisions for educational opportunities for the handicapped to prepare them for suitable employment.

28. In the ensuing discussion, reference to democratization of education was made by a number of speakers, several of whom mentioned that provisions similar to those existing in the German Democratic Republic could be found in their countries, where problems of universal technical and vocational education, as well as continuing education, are being solved. One of the basic problems highlighted was that of access to technical and vocational education, which is sometimes restricted to a limited number of students. It was also pointed out that technical and vocational education is considered a second-rate education when compared with general education in many countries. This has created a social division whereby technical and vocational education is provided to less socially privileged children. One participant suggested that serious consideration be given to democratize general education as well as technical and vocational education so as to overcome the disparity between the two types of education. It was suggested that democratization and broader access to technical and vocational education could be achieved further through providing instruction in the learners' mother tongue.

29. Several participants pointed out the importance of bringing closer together technical and vocational education and vocational training programmes. Ways have been suggested which aim at better articulating technical and vocational education and general education, on the one hand, and technical education and training on the other.

30. The existence of barriers in the systems is reflected in the lack of interest of many young people in technical and vocational education,

due to its being generally a terminal type of education which does not allow for access to higher education. It has been suggested that efforts should be made to remove these barriers to access to higher education and open post-secondary technical institutions.

31. Reforms in the education system for democratization are not sufficient on their own. Employment opportunities are also essential if democratization is to have a real impact on the system.

32. The question of unemployment, especially youth unemployment, was raised by several speakers. Although a major problem in some industrialized countries, it is even more acute in many developing countries. It was recognized that the problem of unemployment is a complex issue and efforts should be made to establish appropriate training coupled with job creation programmes. The problem is also seen as being aggravated by the demand for skills necessary for higher-level, more sophisticated jobs in comparison with the traditional labour-intensive economy, the former calling for fewer employees than the latter. Some participants felt that technical and vocational education, especially for youth, should aim at preparing people for self-employment as well as for salaried employment.

33. Guidance plays an important role and should therefore be integrated into the education system. Co-operation between educational and vocational guidance should be improved. Several speakers referred to reforms of education in their countries which include guidance services. To achieve democratization in the education system, it was indicated that adequate legislation should provide the basis for educational reforms. It is also suggested that increased co-operation and co-ordination would be needed between education, labour, planning, financing and other authorities to promote a true change towards democratization of education.

34. In addition to legislative measures, there is a need for flexible structures, content and methods in the education system as a whole, including technical and vocational education, which would contribute to equal access of all young people to the various types and levels of education.

## 2. Technical and vocational education and human resources development

35. The first statement on the next theme of the Congress - the development of human resources - was made by Mr. G. Besner. He said that the level of training given to workers had continued to rise both because of the increasing demands made by the labour market and because individuals had become aware of the importance of a high standard of training for their own development. For technical and vocational education this meant that there was a tension between the requirements of general training and the demands of the labour market. It had to be admitted that vocational education had changed a number of social situations through its role of enhancing the status firstly of young people, to whom it ensured access to employment; secondly of teachers, who could now feel themselves to be the equals of their colleagues in general education; and lastly of unemployed adults or those whose jobs were threatened by the numerous technological changes of the present day, for whom further training could also give access to employment at a higher level. Technical and vocational education thus made it possible to promote and improve the development of society's human and economic resources.

36. The second statement on this theme was made by Mrs. M. Kisanga. She said that in the 1960s, the countries that had recently become independent had made a considerable effort to develop education, but following the pattern of the developed countries and thus disregarding the traditional sector. The result was that those who went through this system could not all find employment, particularly in the professions.

37. Subsequently, the essentially academic education had gradually evolved towards technical and vocational education. This was set up in close collaboration with the national community, whose needs were better understood and planned in order to provide a response to the requirements of the various groups in society and the different sectors of the economy.

38. The participants all acknowledged the need to develop a technical and vocational education that was capable of training manpower with skills to meet the economic and social needs of each country. They further acknowledged that if the development of human resources was to be harmonious, it had to preserve the social and economic balances between the various skills needed for the development of society. They noted that this was something which had to be planned and was as much the responsibility of central human resources planning policies as of educational planning. The participants further noted that the links existing between technical and vocational education and a country's human resources requirements depended firstly on a survey of the job qualifications needed for economic development and secondly on the establishment of a relationship between the planning of the development of technical and vocational education and that country's economic and social planning. However, they pointed out that the planning and organization of a technical and vocational education adapted to the circumstances of the modern world was not an easy matter. Although a first step was to know what the probable development of the future labour market would be, it would be unwise to make rigid forecasts since training was subject to the ups and downs of the economy, to developments in businesses and to changes in job qualifications and the structure of employment.

39. The participants also stressed that the harmonization of education and the development of human resources should not relate exclusively to the so-called wage-earning sectors but should include all production sectors, meaning small and medium-sized farms and livestock businesses as well as craft work and the various forms of self-employment. In that context, the participants noted that it was difficult to translate the qualifications involved - which ran into hundreds - into terms of job content. Again, the traditional hierarchy of skills, expressed in terms of skilled workers, technicians and middle management, and highly skilled workers, was breaking down under the influence of the reorganization of work caused by the scientific and technological revolution. Given these limitations, the participants stressed the need for open systems and for flexible curricula and structures, adaptable to needs and to change and able to allow everyone to obtain the qualifications or additional training they needed, not only in terms of manual skills but also in terms of scientific knowledge and general culture.

40. Stress was then laid on the contribution that each technical and vocational education establishment could make to the development of its environment with a view to improving the well-being of the local people and so as to build up a reserve of skills for local businesses. This contribution by technical and vocational education to the strengthening of links between

the education system and industry by means of sandwich courses or by the participation of workers in education, should inevitably lead to the emergence of a new kind of contribution on the part of technical and vocational education to the development of human resources. By not relying exclusively on traditional forms of education and by making technology its foundation, vocational education should benefit from the same consideration and be accorded the same level of responsibility as the other kinds of education. Secondary education of a technical nature which included an introduction to technology, such as had been established in many countries, contributed to this process of levelling-out by offering attractive prospects in higher vocational education.

41. The participants also turned their attention to removing the barriers between the different levels of education. This was essential for enhancing the status of vocational education. Any training which led to the rapid award of a final certificate could induce young people into dead-ends from which it would subsequently be difficult for them to extricate themselves.

42. Many speakers, referring to the practice of their own countries, were in favour of these ideas and laid particular stress on industrial or agricultural sandwich courses which provided the future technician and skilled worker with contact with the real world of work and a practical training for employment. In this context, one speaker made particular mention of the experience of his country where every technical and vocational training establishment was twinned with a local business. Both sides entered into an agreement which imposed reciprocal obligations and in particular required the business to provide a large number of training activities for the students, which in fact meant a close link between study and production. The same speaker stressed the role of vocational and technical education in bringing education closer to the working world. The collaboration which had been established as a result through professional advisory committees had, in some cases, made it possible to give a new look to the certificates awarded and, above all, to pass from the idea of a trade to that of competence in a particular field of work, leading to major upheavals in the levels of training.

43. One participant spoke of a modern 'faceted' method which had been developed in his country, which made a precise evaluation of job qualifications possible as well as the development and evaluation of corresponding study programmes and plans in response to the needs of a given branch of activity and, in some cases, of a whole economic sector. This systematic curriculum alignment and 'watch' model (known as the SCAW model) has also been used for updating high technology and informatics courses.

44. Several speakers said that in preparing training programmes, account had to be taken of technical changes and technological progress. Examples of this were the variety of materials and the robotization of production lines. Courses of training had to be provided that were adapted in all branches to the disciplines and occupations existing, as well as a modular education possessing the necessary flexibility within an enlarged and pliable system, adaptable to a changing society. In this way, too, technical and vocational education would be able to resist being supplanted by 'à la carte' training given by a business and consisting particularly in providing senior staff and skilled workers with opportunities to specialize in a variety of fields.

3. The increased participation of women in technical and vocational education

45. This topic was introduced by Mrs. Maria Dentcheva and Mrs. Farida Javed. It was pointed out by both speakers that rapid economic and social development requires greater participation of women in economic activity and also provides an increasing number of opportunities for such participation. In both Bulgaria and Pakistan, women and men have equal access to the various types of professional and vocational education.

46. It was pointed out that in some countries the basic legislative documents such as the Constitution and the Labour Code have eliminated discrimination against the participation of women in any kind of employment. However, if women are to contribute fully to the productive sector, measures are also necessary to alleviate the burden of family duties. These may include day nurseries and kindergartens and other such facilities provided by the government, as well as generous maternity leave. Other measures include the encouragement of equitable sharing of family responsibilities between husband and wife. Boys should be educated from an early age, as well as in adolescence, to develop positive attitudes towards the sharing of family responsibilities.

47. In some developing countries where women were traditionally involved in professions such as teaching, nursing and medicine, there are now growing signs of interest among women to participate in fields that were formerly completely male-dominated, such as engineering (electrical, electronics and mechanical) and architecture. Technical education facilities for women have also developed rapidly in recent years. For example, in one country the first women's polytechnic institute was established in 1975, and during the period 1981-1987 seven more were opened. There are problems in staffing these institutions because of a shortage of women technical teachers, as well as of suitable teaching materials. The establishment of technical teacher training colleges should help to overcome this problem.

48. In the ensuing discussion, it was pointed out that equal rights and self-determination of women have come more strongly to the attention of the international public since the United Nations Decade for Women was proclaimed. There is widespread acknowledgement that women have the right to employment and, in many countries, this right has been secured through appropriate legislation. However, achievement of real equality of employment involves more than legislation and measures to provide jobs. Many millions of women all over the world are in jobs without enjoying even a minimum of equality. Employment should be commensurate with the capabilities and possibilities of women. In the modern technological world this calls for up-to-date regular and advanced training and education, and for insights beyond one given job. Such advanced education has become more urgent than ever before now that production is increasingly linked with scientific and technological progress. One speaker stated that in some developing countries graduates of polytechnic institutions were encouraged to be self-employed or engaged in co-operatives.

49. Several speakers mentioned efforts that are being made to provide women with appropriate education and training. In some countries special efforts have been made to increase the access of girls to basic general education as a prerequisite for further more specialized training. In others, special training programmes for women have been embarked upon in fields which have not, traditionally, been the prerogative of women. Such training programmes

may also be linked with relatively new productive fields such as electronics, instrument-building and robotics. It was also mentioned that as women gain experience in working in some of these newer fields they also become more creative and inventive, and more self-confident. However, much prejudice still has to be overcome in employing women at higher management levels and in some of the traditionally male-dominated fields. In some countries there is also prejudice against girls undertaking technical training. The society prefers girls to stay in general education rather than to receive specific skill training, even though they may subsequently go into industrial employment.

50. Reference was made to the need to cater, both in employment and in training, for the special needs of women. In some countries women's promotion programmes have been established to provide guidance to women in what to study and what career possibilities, linked with their studies, are open to them. It was mentioned that, in one country, there is a full system of social services geared to achieving compatibility of occupational activity with family duties.

51. There was general agreement that, in placing an emphasis on women's emancipation, employment and training, the traditional virtues of women should not be forgotten. Equality is not synonymous with uniformity.

4. Implications of rapid scientific and technological progress for technical and vocational education

52. In introducing this theme, Dr. Hermann Schmidt pointed out that the development of technical and vocational education in the Federal Republic of Germany during the last ten years had been largely influenced by four major factors: (a) the demographic explosion; (b) the change in the general education structure; (c) the growth of unemployment and (d) the impact of information technology. Because the Federal Republic of Germany is poor in natural resources, is mainly export-oriented and hence highly dependent on advanced technology, efforts have concentrated on providing every school-leaver either with academic or technical and vocational education. As the result of special efforts made by the Government, schools, trade unions, employers' associations and private firms, within five years, both the number of training places offered by public and private enterprises and the number of students in full-time vocational schools grew by about 40 per cent; the number of academic students rose by 50 per cent, and about 70 per cent of an age-cohort received some kind of vocational training.

53. Technology is often understood to be the utilization of technical means for specific practical production purposes. The last twenty years have witnessed phenomenal developments in micro-electronics, in communication and in biotechnology, and many believe that we are at the dawn of an information and agricultural revolution. New disciplines such as telematics - the merger of computers with telecommunications - and genetic engineering - the combination of enzyme technology with genetic manipulation - are emerging. Consequently, new skills are being developed in fields like food processing and office automation, computer-aided design or robotics and flexible manufacturing technology. Vocational education and training, being the major ingredient of those activities which contribute to successful economic performance under changing global and domestic circumstances tend to be the connecting link

between the formal and non-formal educational system and the world of work.

54. Mr. Ngundam, who also made introductory remarks on this theme, indicated that the rapid changes in scientific and technological progress have far-reaching consequences on the developing countries which, in the past, supplied the world market with raw materials and agricultural commodities. Many developing countries have recently changed their strategy and switched to the transformation of their minerals and agricultural raw materials to consumable goods to supply the internal market and the South-South trade with those goods. In order to be competitive on the market, however, these countries should raise the production of their industry and increase the quality of their products, and thus introduce new technology into their economy. The appropriate production lines should be designed, new equipment should be selected, installed, operated and maintained and, sometimes, produced domestically. These activities require qualified specialists at all levels, who should be trained by the local technical and vocational establishments.

55. It was suggested that in addition to the traditional task of passing on knowledge which is needed for entry into the world of work, technical and vocational institutions - both in industrialized and developing countries - should keep abreast of changes caused by rapid scientific and technological progress. With reference to this issue the following salient points emerged:

One of the most important changes caused by the introduction of the new information technology takes place in the organization of work. Computer-aided design and flexible manufacturing, both based on the advancement of micro-electronics and software technology, allow small enterprises to produce high-quality and individually designed products, thus favouring the creation of small- and medium-sized enterprises.

The second change caused by rapid scientific and technological progress is that long-term manpower planning is becoming more difficult both in large-scale and small firms and, accordingly, technical and vocational education cannot easily anticipate future technological developments, and thus forecast the quantitative requirements of the production sphere in terms of qualified manpower.

The third challenge for technical and vocational education is the change in occupational structure both in the manufacturing and office environments. Reductions are expected among machine operators, maintenance, warehouse and transportation personnel, as well as office secretaries and the lower echelons of administration. On the other hand, growing demand can be expected in areas of electronic and electrical repairs, measurement techniques, automation and robotics, data processing, management and consultation, and in research and development.

The fourth change emerging is in the qualification requirements of the graduates of technical and vocational institutions: the repetitive, monotonous work on assembly lines, in the printing industry and in offices will be done by Computer Numerical Control machines, typesetting and text-processing facilities and Computer-Aided Design programmes. Consequently, it is believed that routine jobs will be executed by microprocessor-based equipment, human activities will be enriched and the attitudes towards work and environment will be considerably

improved.

In order to educate and train the future employees of the emerging forms of industrial, agricultural and office work, new types of vocational instructors and technical teachers will be required, which constitutes the fifth consequence of rapid progress in science and technology.

56. The close interdependence of social, cultural and economic development on the one hand, and rapid scientific and technological advancement, on the other, demands approaches which reinforce the beneficial effects of the new, emerging technologies while attempting to prevent the negative social consequences associated with their introduction. It was pointed out that these policies will likely demand that technical and vocational institutions furnish their students with new skills and qualifications and, at the same time, provide them with practical 'on-the-job' training. These requirements have micro- and macro-educational consequences for technical and vocational education.

57. Several speakers mentioned that the subject matters of education and training should thus be designed and revised in such a way that they facilitate adaptation to the pace of development in terms of job skill requirements and to the rapidly changing structure of the working environment, as well as to ensuring the flexibility necessary to modify the theoretical and practical preparation of the students according to current requirements. It is the interest of the agricultural, industrial and the service sectors to secure personnel whose preparation corresponds to their sector's needs. Thus these sectors of the economy should participate, as far as feasible, in the work of technical and vocational institutions, to provide them with equipment and trainers and to ensure workplaces for on-the-job training of their students.

58. Finally, there was general agreement that the training content of technical and vocational subjects, due to the rapid evolution of technology, are becoming obsolete more frequently than general education subjects. Over and above the variety of macro-educational solutions applied in different countries, it was emphasized that attention should be given to lifelong education, whether it involves retraining of the labour force of a particular economic sector or simple updating of their knowledge. It was also underlined by several speakers that, in view of rapid scientific and technological progress, technical and vocational education should be based on a solid foundation of general education including instruction in basic sciences and mathematics. This should be followed by broad technical education and training which would permit adaptation to new professional profiles, resulting from technological developments. It was proposed that Unesco should collect and disseminate information on experiences in the development of programmes and teaching/learning materials for technical and vocational education.

#### IV. INTERNATIONAL CO-OPERATION IN TECHNICAL AND VOCATIONAL EDUCATION

59. Thirty-three speakers contributed to the discussion of international co-operation and many of them emphasized the contribution that it can make to international understanding. It was generally agreed that while such co-operation is already taking place, in many ways, its reinforcement is



increasingly important for the development of technical and vocational education. It was emphasized that international co-operation should take into account the cultural, historical and social context of the countries involved and should be based on equality and justice. It should be directed to the mutual advantage of all concerned.

60. The importance of North-South, East-West and South-South co-operation was underlined. The link between economic problems and the development of technical and vocational education was referred to by many speakers from developing countries. It was emphasized that regional co-operation should be promoted, as well as co-operation among developing countries with similar problems.

61. Many suggestions were made concerning Unesco's role in promoting international co-operation. It was pointed out that priorities should be established in order to avoid proliferation and duplication of effort if limited resources are to be maximized. It was also suggested that Unesco should consider actions aimed at popularization of technical and vocational education, investigation of problems related to the use of mother-tongue instruction, the preparation of unified programmes and teaching/learning materials suitable for both regional and international use, studies of pedagogical, psychological and physiological problems related to the application of informatics in the educational process and the development of technical and vocational education in a humanistic spirit and promotion of international understanding and co-operation. Priority should be given to co-operation with developing countries. Additional sources of funding, other than Unesco's own budget, should be sought. Co-ordination of action among all U.N. agencies concerned with technical and vocational education, such as ILO, FAO and WHO, as well as Unesco, was emphasized. Reference was also made to Unesco co-operation with the United Nations Development Programme, the World Bank, Regional Development Banks and appropriate intergovernmental and non-governmental organizations. Co-ordination of efforts at the national level was also essential, for which appropriate mechanisms should be established.

62. References were made to national experiences in international co-operation in technical and vocational education. Various suggestions were made as well as offers of co-operation. It was agreed that technical co-operation should be directed to building up national capabilities - especially with regard to human resources. Countries should not remain aid-dependent indefinitely. Aid should be directed to encouraging countries to find their own solutions to their problems and not try to import ready-made solutions. When the equipment and 'know-how' are imported they need to be transposed so as to be useable in a different cultural setting.

63. The importance of the exchange of information and experience was underlined. It was felt by many participants that the Berlin Congress had been a most effective way of promoting such exchanges. A particularly valuable feature had been the direct contact between individuals present in a personal capacity who could exchange experiences on an equal professional footing. It was suggested that similar meetings be convened by Unesco on a regular basis in the future. Reference was made to the proposed International Conference on Education to be held in 1988 on the theme of 'Diversification of post-secondary education in relation to employment' and to the International Congress on Educational Planning to be held in 1989. Considerable support was given

for the holding of regional meetings, particularly in co-operation with regional institutions and regional networks. An offer of support for one such meeting was made from a Regional Development Bank. Several participants made suggestions for meetings on more specialized themes and topics. These included 'the role of women in technical and vocational education'. It was also felt that small expert meetings on topics such as 'upgrading key personnel (such as teachers, guidance specialists, administrators, etc.)', 'capital investment planning and resources planning' and 'content and methods in technical and vocational education' should be organized. Another related suggestion was to organize small meetings on a series of particular subjects such as 'electronics' and 'electricity' with a view to providing guidance for training in these fields.

64. There was strong support for the suggestion that a mechanism be established for the international exchange of information on technical and vocational education. Such exchanges might include information on activities related to pilot projects, research findings and their applications and new developments of all kinds, especially those related to training. The mechanism could also include a computerized data bank. An international network linking existing computerized networks should be established to promote effective use of this information. In this connection, it was suggested that existing institutions and networks should be used as far as possible. References were made to working with Unesco regional networks of educational innovation for development in Southern Europe, Africa, Arab States, Latin America and the Caribbean and Asia and the Pacific.

65. International co-operation related to curricula, teaching materials, use of modern technology and new teaching methods were also emphasized by participants. It was suggested that consideration should be given to launching a journal on technical and vocational education. Emphasis was placed on the need to rationalize information in this field; it was proposed that a unified terminological dictionary or glossary be prepared. It was also suggested that an attempt be made to standardize facilities and equipment for technical and vocational education. One speaker requested Unesco to develop unified curricula and model textbooks for regional use. Another offered the services of experts from his country, through Unesco, to assist with drawing up syllabuses and also to advise on laboratory layout. It was suggested that computer software could also be developed for use in several countries using a common language. An organization concerned with communication by satellite proposed the creation of international television and radio programmes for technical and vocational education and offered to work with Unesco in this field.

66. Suggestions made for studies and experiments conducted on an international basis included the following - methods for determining changes in the organization of labour; experiments for the development of technical and vocational education related to model manpower profiles, and seminars and studies on goals of technical and vocational education in the light of new techniques and technologies. It was also proposed that a Unesco pedagogical university for technical and vocational education be established.

67. Many ideas were put forward for international co-operation in the development of human resources. Emphasis was placed on the training for agricultural education and rural development. The link between agriculture, health and nutrition in training programmes was also mentioned. The training of young people and women through various types of training courses including

exchanges and study visits was emphasized. Other training modalities included 'third country training' whereby a 'developed' country finances scholarships for training in key institutions in other developing countries. 'Twinning' of institutions in developed and developing countries was also mentioned, as was bilateral and multilateral support for regional training institutions. Other innovative suggestions for training included the preparation of modular training courses on video-cassettes.

68. Many speakers referred to the Revised Recommendation concerning Technical and Vocational Education, adopted by the General Conference of Unesco in 1974, which was considered a useful instrument for the development of this type of education. It was also mentioned that the Revised Recommendation stipulates that Member States should give priority to international co-operation in technical and vocational education. Several speakers indicated that the provisions of the Revised Recommendation could be used as a basis for international co-operation in this field. One speaker suggested that a further revision of the Revised Recommendation might be undertaken to reflect scientific, technological and educational developments with a view to making this instrument up-to-date and relevant to the future needs of Member States. References were also made to the preliminary preparation of a draft international convention on technical and vocational education as decided by the General Conference of Unesco in 1985. While several speakers supported a convention on technical and vocational education, one speaker expressed reservations concerning such a convention, pointing out that the subject of the convention will be considered by the General Conference of Unesco and consequently it is not within the scope of the Congress, which participants are attending in their personal capacity.

69. In order to facilitate future co-ordinated action, it was suggested that an international plan of action be drawn up for the development of technical and vocational education and for promoting international co-operation in this field. A committee of experts should be established to draw up this plan, which could be used in the preparation of Unesco's next Medium-Term Plan. Unesco should further develop its programme in technical and vocational education and increased resources should be made available for this purpose.

70. It was frequently pointed out by some participants from developing countries that the implementation of the various suggestions concerning technical and vocational education could not be fully realized in their countries without the establishment of a new economic order and adjustments to the international division of labour with regard to the introduction of new technologies. Furthermore, reference was made to the problem of external debt, especially in Latin America, which hampers social and economic development.

## V. REPORT OF COMMISSION I

## PLANNING AND ADMINISTRATION

Planning of technical and vocational education

71. In discussing this topic, the participants emphasized that technical and vocational education should have an important place in overall national development plans. Some speakers indicated that technical education still suffers from a low status in public opinion, and sometimes it is not given sufficient priority in national development plans. It was pointed out that representatives of the economic sector, including employers and trade unions, as well as representatives of social organizations, should participate in the planning process at national and local levels, and that the social and cultural aspects of development should also be taken into account.

72. A number of speakers stressed that the planning of technical and vocational education should be based on clearly defined objectives, which would take into account the manpower requirements (based on appropriately developed professional profiles) as well as the prevailing education and training systems. Emphasis was given by several participants from developing countries to include in the planning process the needs of rural development and in particular to provide skilled workers and technicians for agriculture. It was also suggested that technical and vocational education planning should promote endogenous development and take full account of the local social, cultural and environmental situation. Several speakers emphasized the concept of self-reliance and 'learning by working' as well as vocationalization of general education.

73. Some speakers suggested that the planning process should be dynamic so as to keep pace with changes in the world of work. There was need for both long-term and short-term planning based on comprehensive data. The mechanism for planning depends on national administrative structures and varies from country to country. In this connection, several participants described the mechanisms and structures for planning such as agencies and national advisory councils established in their countries. Some speakers indicated that annual conferences were convened in their countries to provide opportunities for various social and professional groups concerned to participate in the planning process. It was stressed that planning should include continuous evaluation to provide feedback for necessary adjustments. Several speakers pointed out that due account should be taken of the scientific and technological progress in the development of plans for technical and vocational education. The importance of research in the methodology of planning, including feasibility studies at micro- and macro-level planning was also mentioned.

74. The need for adequate statistical data as a basis for planning was emphasized and in this connection it was pointed out that such data are not sufficiently available in developing countries. It was proposed that systematic preparation and use of statistics should be developed. It was also suggested that guidelines for the planning process need to be developed at national and international level. Several speakers suggested that IIEP (International Institute for Educational Planning, Paris) should provide training courses

on technical and vocational education planning, with more consideration to be given to the experience of countries which have already established long-range planning systems. Others expressed the wish that Unesco organize regional meetings to consider various issues involved in the planning of technical and vocational education. A particular difficulty cited by some speakers was the forecasting of manpower needs; even larger enterprises are often only able to foresee their requirements one to two years ahead of time. It was also indicated that lack of proper standards in job qualifications rendered planning for technical and vocational education difficult.

75. The financing and costs of technical and vocational education are important factors and should therefore be a prominent consideration in the planning process. In view of the relatively high cost of technical and vocational education, expenses cannot always be covered entirely by public funds and additional sources need to be identified. Several speakers indicated, for instance, that the economic sector should participate in financing technical and vocational education. In this regard, however, it was noted that participation in technical and vocational education by enterprises and employers would be more attractive if its cost-efficiency was improved. Some speakers suggested that schools should be made productive to decrease the training costs, although not at the expense of educational objectives. One speaker suggested that Unesco should develop a methodology for planning technical and vocational education.

Co-operation with agriculture, industry, trades and service sectors and transition from technical and vocational education to employment

76. The transition from school to work should facilitate smooth integration into the world of work as well as return to school for further education and training in the perspective of lifelong education. In this connection, open systems are becoming increasingly important in educational structures. Some speakers indicated that sandwich courses and alternating school-work programmes as well as secondment to industry for given periods have proved useful and increased the adaptation of students to their jobs.

77. Several speakers suggested that teachers should spend periods in enterprises to acquaint themselves with new developments, and selected staff with appropriate qualifications from enterprises should be encouraged to teach part-time in the education system. This helps to renew educational programmes and fosters co-operation between the education system and enterprises. It was also mentioned that technical and vocational education institutions could co-operate with industrial and agricultural enterprises by participating in their research and prototype development projects. The need for establishing appropriate mechanisms such as co-ordinating committees to facilitate co-operation between schools and enterprises was also emphasized.

78. Several speakers referred to their national efforts for the improvement of transition from school to work, in particular in agriculture and handicrafts. It was indicated that the participation of students in small rural development projects enhances close contact with the rural community and promotes collaboration between students and farmers which facilitates the transition to work.

Organization and administration of technical and vocational education

79. In discussing the organization and administration of technical and vocational education, it was pointed out that a major function of administration is the integration of planning, its implementation and evaluation into a coherent mechanism. In this context, co-ordination has been considered essential to avoid duplication and wastage. It was also indicated that the improvement of co-ordination is contingent upon an effective flow of information. Several speakers described their country's organizational structure for administration of technical and vocational education, some of which include an inter-ministerial co-ordination committee. References were made to separate ministries or departments for technical and vocational education and in some countries state committees or corporations where education and training activities are administered. Some speakers referred to a dual system where technical and vocational education is administered by the educational authorities and the training aspects are covered by enterprises, on the basis of legislation which ensures adequate co-ordination. It was also pointed out that co-ordination between technical and vocational education and general education should be strengthened.

80. Several speakers mentioned that in their countries the provisions of Unesco's Revised Recommendation concerning Technical and Vocational Education are taken into account in policy formulation and, accordingly, public agencies or consultative or advisory bodies have been created to allow for the participation of representatives of various ministries, trade unions, youth organizations, etc. Reference was made to the establishment of central research institutes to carry out studies on various aspects of technical and vocational education with a view to assisting the administration and facilitating the decision-making process.

81. The question of centralized vs. decentralized administration was referred to by a number of speakers who indicated that the administration of technical and vocational education depends on national administrative systems and structures and that these varied from country to country. It was indicated that both centralized and decentralized administration exist in many countries to varying degrees, although there is a general tendency to increase local participation and management of technical and vocational education. It was also noted that in some countries, administrative systems which combine central government guidance with decentralized responsibility on the part of enterprises and local bodies - especially when defining a uniform policy in education - have proved successful for the implementation of technical and vocational education.

82. An important role of administration is the management of personnel and facilities, for which appropriate standards are required. Several speakers from developing countries mentioned a shortage of personnel with adequate qualifications, and the urgent need for developing pre-service and in-service training programmes for teachers, especially for the introduction of new technologies. One speaker indicated that in-service training is relatively costly because of transportation and replacement of teachers and also difficult to organize because of different training needs. It was underlined that existing systems should be restructured or new systems developed to bring pre-service and in-service training closer together. A 'crash programme', with long-term and short-term courses, was described in this connection using distance education. A number of speakers also referred to the use of mobile training units for upgrading teachers.

83. Several speakers emphasized that increased attention needs to be given to the selection of candidates for teacher training who should have, in addition to the required general education and technical skills and knowledge, the necessary human qualities and an interest in the teaching profession. It was also suggested that national administrations should develop a career and promotion system and provide incentives to keep good technical teachers in their profession. In this connection, some speakers highlighted the importance of supervision to ensure that the standards for teaching and facilities are maintained.

84. Several participants proposed that Unesco further promote staff development by creating regional training institutions. It was pointed out, however, that it is more efficient to use selected existing national institutions for this purpose, which could organize regional training courses with the support of international organizations, instead of creating new institutions. With regard to the Asian region, reference was made to the Asian and the Pacific Programme of Educational Innovation for Development (APEID), which includes technical and vocational education in its activities, and to similar institutions in other regions. It was also suggested that results of educational research in technical and vocational education should be widely disseminated.

85. With respect to the management of facilities and equipment, it was noted that some equipment for technical and vocational education becomes obsolete rapidly due to technological progress and it needs to be replaced. In this connection, use could be made, for training purposes, of facilities already available in enterprises, whenever possible. It was also indicated that in many developing countries the maintenance of equipment and the provision of spare parts is often neglected. One speaker described the successful use of mobile groups for maintenance of equipment. It was generally acknowledged that technical and vocational teachers should have basic maintenance skills and that sufficient provision be made in technical and vocational education budgets for recurrent expenditures. The growing use of computers in the administration of personnel, examinations of students and management of facilities and equipment was also mentioned. In this connection, a lack of adequate software and trained personnel seems to be a problem in many countries.

#### Key personnel in the development of technical and vocational education

86. The implementation of technical and vocational education calls for key personnel comprising several distinct categories with specific functions, the level of training and qualification of whom is decisive for the performance of the system. Apart from the teachers, the categories concerned consist of the administrative staff, those responsible for establishing technical and vocational education policy and those who supervise its implementation. They also include planners, curriculum design specialists, educational research workers and supervisors. Finally, heads of establishment, whose role is decisive in the quality of the implementation of central education policies, are included among the key personnel of technical and vocational education.

87. A further specific category consists of 'teacher educators', who are vital to the development of technical and vocational education in that their role in the pre- and in-service training of teachers and in any other educational activity forming a part of teacher training, is of prime impor-

tance in the quality of the personnel so trained. One participant said that key personnel in his country consisted of categories which changed in accordance with the specific forms of education which, in their turn, varied according to regional circumstances. Other participants noted that there were often insufficient key personnel for technical and vocational education in the systems of developing countries, e.g. there were not enough inspectors, supervisory personnel or curriculum specialists and sometimes no research workers. However, whatever the numbers of this category of personnel, training, further training, re-training and evaluation activities were necessary as well as administrative and management measures such as recruitment, the establishment of salary scales and career promotion.

88. Staff were generally recruited from recent graduates without practical experience in their discipline. Such experience could be acquired on the job or could be accelerated by training courses, by series of lectures or by further training sessions. Extra training concerning the functioning and objectives of technical and vocational education was generally necessary. It was acknowledged in this connection that the development of the technical and vocational education system necessarily called for re-training and further training activities for key personnel. One participant said that the training of personnel was necessary for the renewal of the structure of the system's administration, and another participant suggested that a unified profile of qualification requirements for technical teachers be developed. Quoting the example of his own country, one speaker said that a national and/or regional meeting of directors of establishments, administrative staff and teachers was held at the end of every school year in order to evaluate the year that had just ended and to organize a further training session for the teachers.

89. As a number of participants stated, administrators, planners, curriculum specialists, and researchers were generally recruited from the ranks of graduates. Such personnel only became effective if the level of their technical knowledge was reinforced by a sound knowledge of their responsibilities. Training for heads of establishment was often informal, without any prior grounding in the principles of management and administration. According to one participant, the criteria for selecting directors in his country took into account the candidates' technical and educational training, their motivation and their professional experience within their special field. Their performance was further improved by means of study tours and by professional meetings. In another country, candidates for directors' posts had to be of the required academic level and be competent and experienced.

90. Some participants suggested that Unesco should consolidate its action in regard to the training of key personnel for technical and vocational education through seminars and regional-level courses dealing with the development of teaching materials and exchanges in these fields.

#### Educational and vocational guidance

91. It was stated by several speakers that vocational guidance and counselling has become increasingly important in the context of educational and training systems which aim at self-realization and full development of the individual taking into account the manpower demands of the society, and contributes to smooth transition from school to working life. Guidance services provide information on employment and training opportunities and assist the



individual in making career decisions, which renders technical and vocational education more cost-effective. They also promote the development of favourable attitudes towards technical careers and democratization of technical and vocational education.

92. Some speakers indicated that guidance and counselling should be viewed as a continuous process and a vital element in education to be provided to both males and females and should not be limited to students in schools only, but should also be available to the community at large with a view to facilitating access to lifelong education and training. It was also suggested that special guidance materials for girls and women should be developed.

93. Several speakers referred to their national structure for guidance services and pointed out that the functions of guidance and counselling are broad and vary significantly depending on the state of development of such services in different countries. References were made to organizational structures for co-ordinated vocational guidance services involving national, regional and local centres. Attention was drawn to the necessity for close links and collaboration between educational and labour authorities in countries where the responsibility for vocational guidance is divided between such authorities. The role of media and modern information technology, as well as parents, employers and trade unions in vocational guidance was underlined by some speakers.

94. It was suggested that a nationwide information system should provide the required data for guidance services. For this purpose, special facilities and personnel would be required for collecting, classifying and disseminating information on each profession as well as on the needs of employment and the world of work. The use of computers was considered to facilitate significantly the work of such services and opened new possibilities for self-information, assessment and guidance.

95. The availability of trained personnel was essential for adequate guidance services. It was pointed out that the training programmes for guidance specialists should comprise technical, psychological, pedagogical, sociological and economic elements as well as practical experience in enterprises. Teachers should play an important role in vocational guidance services and they should receive the necessary training. It was pointed out that in some countries vocational guidance courses were being introduced in teacher training institutes as compulsory subjects. Retraining and refresher courses were also offered to teachers and specialized guidance and counselling personnel.

96. Several speakers suggested that Unesco, in co-operation with relevant non-governmental organizations and professional societies concerned with vocational guidance, undertake the following activities: a research programme on vocational guidance; development of model software for self-guidance; establishment of a data bank of trades and occupations; comparative studies of national guidance services; promotion of exchange of information and materials; publication of a periodical journal on technical and vocational education which would include vocational guidance; and establishment of guidelines for the successful development of educational and vocational guidance.

## VI. REPORT OF COMMISSION II

## INNOVATIONS IN CONTENT AND METHODS

Technical and vocational aspects of general education

97. In discussing this topic, it was agreed that technical and vocational initiation are receiving greater emphasis in general education than hitherto. Such initiation can contribute to personal development in various ways, including that of helping young people to become more aware of possible career options. The term 'technical and vocational initiation' refers to those parts of general education that are designed to familiarize students with certain basic notions in technology including the basic concepts and processes of technology and its role in daily life. It was considered that communication skills (reading, writing and speaking), numeracy and scientific literacy contribute to technical and vocational initiation. Computer literacy is also regarded as a basic ingredient in some countries. Initiation to technology could also include a cultural component as well as issues related to social relevance of technology.

98. Many countries have launched projects aimed at incorporating a technological component into general education. Some of these projects were described by participants. It was noteworthy that these generally involved co-operation between schools, technical and vocational training institutions and industry. It was pointed out that initiation to technology, technology education or polytechnical education is not the same as professional orientation; the former usually precedes the latter and may start as early as in the primary school. Initiation to technology aims at increasing the young people's creativity and imagination. It also develops competencies generally required in the technological process such as decision-making and design skills, as well as the development of basic practical aptitudes and skills by working with simple tools and equipment. It attempts to integrate the theoretical and practical aspects of technology and work.

99. The initiation to technology in the context of general education poses a number of practical problems, which are being solved in a variety of ways. The provision and training of teachers is one of the basic problems in many countries. In some countries technology teachers already exist and they are being retrained to learn modern approaches. Pre-service training courses are also being established to produce a flow of new teachers for technology education. In some cases teachers are prepared to teach technology as well as the basic science subjects such as physics and mathematics.

100. The question of whether the preparation of teachers for initiation to technology should be the responsibility of technical and vocational education institutions or teacher training colleges for general education was raised by several speakers. In this connection it was suggested that excessive specialization should be avoided and that broad multi-disciplinary training would be appropriate. It was also indicated that technical and vocational teachers with relevant pedagogical training could be suitable to introduce students to technology education and the world of work.

101. Another problem referred to by several speakers was the provision of physical facilities. It was pointed out that laboratories and workshops

were expensive to establish and equip. In one country, central laboratories have been established, shared by a number of schools. In the evenings these are used for adult education. In this context, the concept of the educational institution as a productive unit was also mentioned. The creative use of students' free time, the production of useful equipment, and student participation in finding solutions for minor technical and maintenance tasks could contribute to their general polytechnical education. Visits to industry and other technical installations and to exhibitions may form an important part of technology education. However, it was pointed out that visits may pose practical problems, as well as the problem of finding sufficient time in the school time-table to accommodate such activities.

102. Some speakers suggested that the nature and role of technical and vocational initiation in the context of general education need to be further clarified. In addition, increased attention should be given to teacher training and to exchange of information and materials in this area.

#### Curriculum Planning and Development in Technical and Vocational Education

103. It was agreed by many of the speakers who contributed to the topic that effective curriculum planning for technical and vocational education is a dynamic process. It must respond both to the needs of the individual and to the technical requirements of the job, as well as the changes in job patterns caused by scientific and technological development and socio-economic requirements. A multi-disciplinary effort is necessary and an on-going mechanism should be established for consultation among the various people involved. These include professional groups of various kinds, representatives of industry and general educators as well as the teachers of technical and vocational education.

104. The extent to which curriculum planning and development should be a centralized or more localized function was discussed. One solution proposed in the case of planning complex curricula was that the content could be defined at the central level, but that the specific needs of individual industries should also be taken into account. Reasons given for defining content centrally were to provide a uniform level of training for skilled workers; to provide training of a high standard which was also broadly based in order to ensure the required flexibility of the work force; and to maximize the contribution of technical and vocational education to individual development. It was felt that the centralized approach need not conflict with local variations linked with different industries if the curricula contained guidance for teachers on how to adapt the teaching material to local needs. There should also be options from which teachers could select in accordance with the needs of particular concrete situations. It was suggested that curricula for each skilled trade should provide for a three month in-service (on-the-job) course towards the end of the training period aimed at preparing the trainee for specific job requirements. Other references were also made to the creation of specific modules at the end of the course to respond to the specific needs of the world of work.

105. Several participants referred to the importance of a basic general education, including a good grounding in science and technology designed to meet the changing needs of scientific and technological progress. It was suggested that attention should be given to fostering problem-solving skills and the ability to cope with change and the concepts of self-learning and

"learning to learn". The need for civic education was also mentioned as well as education for international understanding and peace. One speaker suggested that to provide a balance between general education and technical and vocational education, the curriculum should be developed in accordance with a list of required competencies. Other references were made to competency-based learning.

106. Several participants, particularly from developing countries, referred to lack of teaching materials. It was suggested that Unesco should encourage the exchange of materials, and also promote the use of the bank of technical illustrations which it has compiled.

#### Computers in technical and vocational education

107. In discussing this topic, several speakers stressed the growing impact of computer and telecommunications technology on daily work and mentioned that the industrial societies of the last century are gradually developing into the so called information societies. The merger of computer and telecommunication technologies, which is often called information technology, allows the storage, processing, retrieval and transmission of large amounts of structured information at an extremely high speed. The stored programme technique makes the computer a versatile instrument which can be equally utilized in science and engineering, in business and commerce, in communications and entertainment as well as in education.

108. The introduction of information technology in national economies, leads to considerable changes in production methods, in occupational structures and in skill requirements of the labour force. Several speakers pointed out, however, that the level of application of information technology differs from country to country and consequently its impact on production methods and the organization of labour in various countries differs considerably. Two speakers from developing countries indicated that, due to the various pressing needs of their national economies, the introduction of information technology has not been given sufficient priority. Collaboration between developed and developing countries can assist in bridging the technological gap. This should be ensured through international solidarity.

109. Many speakers suggested that the use of computers in education was having diverse consequences, both in the organization of education and in the learning process. These consequences are found at different levels: at the macro-level, information technology affects the organization and the management of the educational system; at the middle-level, this technology assists in the decision-making process about the organization of the teaching programme, the distribution of school resources, vocational guidance services for students and evaluation; finally, at the micro-level, the information technology affects the interaction between teachers and students.

110. Many speakers attached considerable importance to the application of information technology in the learning process and suggested that it should be introduced in technical and vocational education. Computer-Managed Learning (CML) was used as a means to support tasks such as preparing and analyzing tests for diagnostic or examination purposes, guiding students through individualized learning etc. Computer-Aided Instruction (CAI) was utilized for such applications as "drill and practice", simulation, modelling or graphics. It was stressed that computer simulation could replace costly model

building in certain fields. Several advantages of the use of computers in teaching were identified, such as self-paced or individualized learning, feedback to students, increased creativity, reduction in the teaching load.

111. References were made to certain disadvantages in the use of computers. When working on computers the real world is reduced to "yes-no" answers, and consequently, the artistic and cultural dimension of education could be somewhat limited. The preparation of courseware by interdisciplinary teams, involving administrators, educators, computer specialists, sociologists etc. is not always easy. The courseware and the evaluation are not always fully reliable because they contain programme bugs or sometimes are designed and produced by persons lacking the necessary technical and educational qualifications. Some speakers suggested that courseware utilized in various technical and vocational institutions should first be tested on a pilot scale in selected schools before being widely disseminated..

112. Reference was also made to the problem of maintenance of computers and lack of spare parts in certain countries as well as the incompatibility between computer systems and available courseware. It would be advisable to establish guidelines for standardizing equipment and technical facilities, in accordance with scientific and pedagogical requirements. One speaker referred to the possible adverse effect of the systematic use of cathode-ray displays on vision.

113. One of the principle problems for the application of computers was the training of teachers. It was suggested that all teachers should gradually follow 'computer literacy' courses to be able to teach 'basic skills to learn'. The computer literacy courses should become an integral part of the curriculum of general education. The teachers of specific subject matters, together with computer specialists, could work together in the elaboration of relevant courseware.

114. Several speakers suggested that Unesco, in collaboration with relevant institutions in Member States, undertake the following: (i) elaborate a series of technical recommendations to assure the compatibility between software and courseware products designed for technical and vocational education; (ii) help in developing instruments for the pedagogical evaluation of various courseware to be used in technical and vocational education institutions; prepare a terminology guide for the courseware in technical subjects; (iii) provide clearinghouse activities for available courseware for technical and vocational education and promote exchange of information and material among relevant institutions in Member States.

Innovations in the methodology of training, continuing education and distance education

115. In discussing the methodology of training, it was emphasized by a number of participants that radical changes have taken place in their countries in recent years. In particular the concept of 'life-long skills' and the recognition that training is no longer a 'once-for-all' activity geared to a particular occupation has far-reaching consequences for training programmes. Provisions of various types are being made for continuing education. One of the most significant of these, in many countries, is distance education, especially through television and radio channels.

116. References were made by several participants to modular training courses which could be used both in initial training and also in continuing education. One speaker suggested that the modular teaching/learning approach should allow the learner to continue into higher education. One speaker referred to a scheme in his country for combining work and study in a "sandwich-type" course. Many attempts are being made to up-date text-books and other training materials and to use modern technology, including computer-assisted learning, for training purposes.

117. Several speakers outlined measures for improving and up-dating the skills and competencies of technical teachers and instructors. One of these is the establishment of technical teachers' up-grading centres. In one country such centres have been established for trade teachers, vocational teachers and art and craft teachers. Another centre is being prepared for agriculture teachers. It was generally agreed that this kind of up-grading is one of the key areas for the improvement of technical and vocational education as a whole.

118. In view of the fact that there are many similarities in the methods used both in initial training and in continuing education, it was suggested that Unesco should encourage greater consultation among those working in these fields. It was also suggested that Unesco should collect and compile information on innovative approaches to up-grading technical teachers and make this information widely available.

#### Research and evaluation in technical and vocational education

119. Many countries engaged in building or improving their technical and vocational education systems are now placing an emphasis on research and evaluation activities. In some countries, national institutes for technical and vocational education have been established with the purpose of carrying out studies on ways of promoting new developments in this field. Several examples of such institutes were mentioned, all of which undertook studies on various types of courses, teaching methods utilizing modern technologies and new equipment. Other fields of study that were referred to included career guidance and comparative studies of systems and practices in various countries.

120. The link between research and development was mentioned by several speakers who indicated that the ultimate aim of such research is to provide a solid theoretical basis for further development and improvement of technical and vocational education. It was also suggested that experience gained through the execution of experiments, scientific studies, pilot projects and new methods should be disseminated in such a way that it could be beneficial on a broad scale. Methods of disseminating research findings that were mentioned included manuals, guidelines on teaching methods and materials, and articles in periodicals used by teachers.

121. It was pointed out that research in technical and vocational education must be linked with research in other fields of education. Those working in this field should co-operate, when appropriate, with economists and industrial scientists, sociologists and psychologists.

122. With regard to evaluation, several different types were mentioned. One example was the testing of new subject matter and teaching methods in

a number of fields through a national network of vocational education facilities. The results of these studies were widely disseminated. Reference was also made to various ways of assessing student performance, including practical and workshop training. Another form of assessment was the evaluation of the suitability of training courses in relation to the skill requirements for various types of work. The need for the development of evaluation and assessment instruments was mentioned. One speaker pointed out that in the evaluation of technical and vocational education, consideration should be given to the world of work and to economic development.

123. International co-operation in research in technical and vocational education can also help to gain new insights and useful experience. It was suggested that Unesco should support the establishment of an international centre for research and development in technical and vocational education. Such a centre could, among other things, collect and categorize relevant information concerning technical and vocational education in the various Member States, establish a data base of knowledge items and references in the various disciplines and fields and create an international computer network to promote effective use of this information. It could also encourage the training of competent curriculum developers in the various Member States.

124. It was also suggested that Unesco support university institutions focusing on the pedagogical sciences, especially related to technical and vocational education. Further suggestions were made concerning Unesco support for exchange of information, including the publication of a journal for international exchange of opinion and experience in technical and vocational education.

125. In conclusion, it was suggested that a key issue which remains to be resolved in many countries is how research institutes for technical and vocational education can operate most effectively. How can the research which they undertake reflect the close relationship which exists between technical and vocational education and the world of work? How can appropriate links be established with educational research institutes working in the field of general education? How can research projects linked with the work of these institutes be incorporated into training programmes for teachers and teacher educators?

## ANNEX 1

Themes for Discussion

1. Review of major trends in technical and vocational education
  
2. The role of technical and vocational education in national development:
  - Contribution of technical and vocational education to the democratization of education and social progress;
  - Technical and vocational education and human resources development;
  - Implications of rapid scientific and technological progress for technical and vocational education;
  - Increased participation of women in technical and vocational education.
  
3. Strategies for the improvement of technical and vocational education:
  - A. Planning and Administration
    - Planning of technical and vocational education: methodology, structures, facilities and resources;
    - Co-operation with agriculture, industry, commerce and services and transition from technical and vocational education to work;
    - Administration and management of technical and vocational education;
    - Key personnel for development of technical and vocational education;
    - Vocational guidance and counselling.
  - B. Innovation in content and methods
    - Technical and vocational initiation in the context of general education;
    - Curriculum planning and development in technical and vocational education;
    - Application of computers in technical and vocational education;
    - Innovations in training methodology, continuing education and distance education;
    - Research on technical and vocational education pedagogy and evaluation.
  
4. International co-operation for the development and improvement of technical and vocational education



**ANNEX 2**

**Address by Mr Michel de Bonnecorse,  
Deputy Director-General of Unesco**

**on the occasion of the opening of the  
International Congress on the Development and  
Improvement of Technical and Vocational Education**

Mr First Vice-Chairman of the Council of Ministers,  
Ministers,  
Ladies and Gentlemen,

It is a pleasure for me, on behalf of the Director-General of Unesco, Mr Amadou-Mahtar M'Bow, to welcome all the participants to this first International Congress on the Development and Improvement of Technical and Vocational Education.

May I first express our profound gratitude to the authorities of the German Democratic Republic. By extending their hospitality to us in Berlin they have proved once again the priority which they give to technical and vocational training in the education of young people. The system of poly-technic secondary education in your country, Mr First Vice-Chairman, is indeed a clear illustration of the very special links which can be established between education and the world of work. It is no exaggeration for me to say that the achievements of the German Democratic Republic in technical and vocational education are quite remarkable, and I am sure that the information that the specialists from this country will give us will be heard with the greatest of interest. The participants are men and women of distinction, comprising participants from many countries in all regions of the world, as well as United Nations institutions and international non-governmental and intergovernmental organizations. This is already a success. I should like to extend my warmest greetings to them all.

We are thus meeting together today to see what progress has been made but also to see what the problems of technical and vocational education are in the different countries and in the different regions of the world.

I said just now that this Congress is the first of its kind. This means that it is a unique opportunity to try to arrive at an overall view of the situation and to fill out information which is still too fragmentary. Any attempts to make comparisons - and even more so, to carry out an evaluation - between one country and another, run up against the great variety of systems which, throughout the world, provide training, directly or indirectly, for an occupation. The terminology used is itself sometimes uncertain and some common terms may designate very different educational levels and content depending on the context in which they are used and depending on the occupation and the sectors concerned - industry, agriculture, trade and the service sector and even, occasionally the applied arts and para-medical professions.

In most cases, technical and vocational education is, of course, under the authority of the ministry of education, but it is not uncommon for some training courses to be run under the auspices of other ministries such as the ministries of labour or social affairs, or again, those responsible for the economy or health. This makes the gathering of information even more complicated. These many different affiliations of technical and vocational education recur at the international level, with the involvement not only of Unesco but also of ILO, UNIDO, FAO and WHO, each in its own field of competence. It is, indeed, a matter of constant concern to us to maintain the necessary co-ordination with all the agencies of the United Nations system that are in any way concerned with technical education and vocational training.

As I was saying, the collection of information in this field is particularly difficult. It was therefore not until September 1983 that Unesco was able to publish the first comprehensive statistics, and even then they concerned only secondary technical and vocational education. They showed that in ten years, i.e. between 1970 and 1980, the number of students enrolled in this type of education had risen from 15.7 to 24.3 million - a growth rate of 45 per cent - whereas during the same period, the enrolment in general secondary education rose by only 39 per cent. More recent, but also less complete, figures confirm this rapid growth in the number of young men and women enrolled in the various branches of technical and vocational education.

This is particularly true of the industrial countries. According to available statistics, the ratio between the number of pupils enrolled in technical and vocational education and those enrolled in general education, at the secondary level, is now 1 to 4 in the European countries but is still only 1 to 8 in the developing countries as a whole and only 1 to 15 in Africa. It is to be noted that these statistics do not include persons enrolled in part-time apprenticeship and technical training schemes, which are widely developed in the industrial countries. This shows up in an even more striking manner the very insecure situation which prevails in this respect in the developing countries.

This situation is, of course, all the more disquieting as the development of technical and vocational education is today one of the conditions, and I was almost going to say a prerequisite, of development.

Unesco's efforts are thus very specially directed towards the training of what we call the 'key personnel' of this kind of education, i.e. planners, teacher educators, inspectors, administrators, etc., who have a decisive part to play in the development of infrastructures and curricula. The pre-service and in-service training of teachers, the improvement of their status and the modernization of equipment in laboratories and workshops are also priority aspects of our action.

Thus in the last five years, Unesco has co-operated with more than 55 Member States under its Participation Programme, providing them with technical and advisory services, fellowships and study travel facilities and helping them to develop their infrastructures and to train the personnel they needed. During the same period, Unesco, with the assistance of extra-budgetary resources, has also carried out some 50 projects, national or regional, for a total of some 45 million dollars.

Although this action by Unesco in the field aims, above all, of course, to provide solutions to specific problems, it is also a valuable source of experiment and innovation. To quote just one example, pilot projects were undertaken, in 1984 and 1985, in Africa and in Latin America and the Caribbean and are at present under way in Asia, in order to investigate ways of adapting technical and vocational education more successfully to the particular needs of rural areas. It is recognized, in fact, that the development of a technical agricultural education which is in touch with the actual situation of the rural world is one of the keys to self-sufficiency. The lessons learned from this experiment can certainly be profitably applied in other countries and in other contexts.

Indeed, we must devote our fullest attention as much to the improvement of technical and vocational education and to its adaptation to the needs of national development and to technological change as to its quantitative expansion. In this connection, the exchange of information is vital. It is perhaps relevant to emphasize that in five years, Unesco has produced and circulated over 40 studies and technical documents on such matters as the policies, planning and administration of technical and vocational education, its integration into general education, the application of computers to this type of education, the development of a multi-lingual terminology in this field, etc.

To these efforts should, of course, be added the action that Unesco has for a long time undertaken to foster the application of the Recommendation concerning Technical and Vocational Education. This Recommendation was adopted in 1962, over a quarter of a century ago now, and was revised in 1974. It constitutes a valuable instrument of reference for the establishment or reorganization of technical and vocational education systems in most Member States.

Mr First Vice-Chairman,  
Ladies and Gentlemen,

Adapting education systems to the real world of work is a necessity that is more pressing than ever, not to say a 'burning obligation'. This is patently clear now when unemployment, practically the world over, is a source of helplessness and even of distress for more and more young people and for society as a whole.

The development of a technical and vocational education that can train a labour force and technicians whose qualifications match national economic needs is certainly, today, a major concern.

However, the planning and organization of a technical and vocational education which is adapted to the actual situation in the world of today is not an easy matter. Of course, a good knowledge of probable developments in the labour market is a prerequisite. Nevertheless, it would be unwise to make forecasts too far ahead in this field since training is subject to the ups and downs of the economy, to developments in businesses and to changes in job qualifications and the structure of employment. It is also a fact that in deciding on the human resources that are needed, national development plans essentially take into account the so-called wage-earning sectors. However, the development of human resources must concern all sectors of production from small farms and small livestock businesses to

craft work or the various forms of self-employment. In addition, in a world context in which production techniques are, as we all know, changing so fast, a significant increase in the number of persons forced to change their jobs during their lifetime must be expected. This calls for open systems of technical and vocational education and for flexible curricula and structures, adaptable to needs and to change and able to allow everyone to obtain the qualifications or additional training they need, not only in terms of manual skills but also in terms of scientific knowledge and general culture.

In this connection, I should like to mention a question which is on the agenda and which will certainly occupy an important place in your discussions. This is the implications of scientific and technological progress for technical and vocational education.

The technological revolution that we are experiencing can certainly be compared to the industrial revolution of the beginning of the century but it is much more demanding on education and training systems because of the speed with which technological advances are being applied in industry. The organization of work has already undergone considerable changes as a result and will change still further in the years to come, which is bound to have far-reaching repercussions on the organization of technical and vocational education.

Biotechnology will thus certainly bring about radical changes in the so-called 'agri-business' sector, which cannot fail to have an effect on agricultural and rural technical education. Electronics have already brought about enormous changes such as computer-assisted design or the robotization of assembly work in industry. In the service sector, computer technology and office automation have resulted in the integration of work that was previously spread among individuals whose know-how is now virtually obsolete. And then there is the communications sector, where satellites and micro-electronics are opening up horizons that were still undreamed-of scarcely 20 years ago.

In this context, the role of technical and vocational education will be decisive. Either it will be capable of adapting rapidly and of meeting demand by means of innovatory strategies and methods - and I am thinking, for example, of the introduction of modular forms of education which, in addition to the advantages of flexibility and effectiveness, can enable the unit costs of training to be considerably reduced; or there will be a widening of the gap which still exists in too many countries between technical and so-called general cultural education and a danger that the break between education systems and the world of work will become complete.

We should make no mistake about it. What is at stake is not just a matter of economics. It is a social and I would even say an ethical matter. Giving prominence to technical and vocational education and to the improvement of its quality and its effectiveness is an essential precondition of the democratization of education.

The aim is to ensure equality of opportunity for everyone, men and women, not only as regards their place in society but also as regards their personal fulfilment. However, technical and vocational education is still too often considered to be just a refuge, a second-best way offered to those who could not gain admission to general education. Up-grading the value of technical and vocational education is certainly an urgent task.

It calls first of all for a renewal of its content. Unlike accelerated vocational training designed to fill specific jobs immediately, this type of education should be organized in such a way as to comprise a solid foundation of general, scientific and technological training which will certainly prepare young people for work but without subordinating them to purely economic or circumstantial aims.

Up-grading the value of technical and vocational education calls for a reevaluation of the status of the teachers themselves and for recognition by society of the work they do and of its importance.

Last of all, and most importantly, it calls for a reorganization of the systems of education. One of the fundamental questions asked by anyone who starts to think about education is how to establish open systems offering a variety of outlets and entrances from the side, excluding dead-ends and providing for both horizontal and vertical mobility. For my part, I am looking forward with interest to the exchange of ideas on this topic that will take place during the discussions.

There, then, in very brief outline, are some of the thoughts that I wanted to share with you. With your permission, I should like to add one further remark, which is also an appeal.

If, as I believe, the expansion and modernization of technical and vocational education are a concern that is shared by all States and all regions of the world, they are also an area in which the strengthening of international co-operation is a matter of particular urgency. The importance of what is at stake, as well as the scale of the resources that are needed, make it vital for everyone to join forces and to unite their efforts.

The systematic organization of exchanges of information at the international, regional and subregional levels and, in particular, the improvement of exchanges between industrial and developing countries and between developing countries confronted by similar problems, could be greatly facilitated by setting up networks of relevant institutions. The experiments conducted in various fields and the innovations which they entail could constitute a priority in these international exchanges. The harmonization of terminology and the use of international standards for units of measurement, scientific and technical symbols, occupational qualifications or safety measures, would, in their turn, facilitate international co-operation and the exchange of data and experience.

These few suggestions and these brief remarks of course give only a faint idea of the variety of topics and problems which are going to be examined here and which are, when all is said and done, topics and problems relating to the preparation for work, and also for success at work, of countless men and women. There is an uncertain world and we can scarcely make out the shape which ever-renewed technological change is beginning to impart to it. While we wonder what the future will be, allow me for a moment to turn to the past and to say how happy I am to be here when you are celebrating the 750th anniversary of the birth of Berlin. I should like to associate myself with this celebration and to express my admiration at the amazing destiny of the two tiny townships of Berlin and Cölln which, 750 years ago, were sleepy settlements on the banks of the river,

Ladies and Gentlemen,

In conclusion, I may say that the outcome of this first Congress is awaited with the greatest interest. Unesco is in fact planning to publish the report on your debates and to make it available to the specialists, institutions and decision-makers concerned as well as to various international and regional organizations. The Director-General, too, will examine the conclusions of the Congress with the greatest interest and will draw from them all that can be learned with a view to the preparation of the next Medium-Term Plan of Unesco which, as you know, will guide the action of our Organization during the last ten years of our century.

Ich danke der Deutschen Demokratischen Republik für diese Initiative.

Danke für die perfekte Organisation.

Ihnen allen eine erfolgreiche Arbeit und viel Erfolg.

Thank you to the German Democratic Republic for this initiative.

Thank you for its perfect organization.

May I wish your deliberations every success and success to each one of you.

**ANNEX 3**

**Address by Mr Werner Krolikowski,  
First Vice-Chairman of the Council of Ministers  
of the German Democratic Republic**

**on the occasion of the opening of the  
International Congress on the Development and  
Improvement of Technical and Vocational Education**



Ladies and Gentlemen,

On behalf of the Council of Ministers of the German Democratic Republic and its Chairman, Comrade Willi Stoph, the sponsor of this Congress, I bid you, the participants in the Unesco International Congress on the Development and Improvement of Technical and Vocational Education, a cordial welcome to our country. My special greetings go out to Mr Michel de Bonnecorse, Deputy Director-General of Unesco.

The German Democratic Republic considers it an expression of acknowledgement for its constructive co-operation in the United Nations Organization and its specialized agencies, including Unesco, and a sign of recognition for its educational policy in the interests of the people that your Organization has chosen Berlin as the venue for this important international Congress. It is a great pleasure for us to provide the conditions to contribute to the success of your Congress. It is a great pleasure for us to provide the conditions to contribute to the success of your Congress.

Ladies and Gentlemen,

During the next few days, you will be guests in our capital, Berlin, which is commemorating its 750th anniversary this year. Together with many visitors from all corners of the world - politicians, artists, scientists and tourists - Berliners are observing this festive event full of joy and optimism. Here, in the metropolis of our socialist German state of workers and farmers, it is clear for all to see how socialism in this country makes it possible for all people to live a happy and secure life with good prospects for the future, and how it satisfies their material and intellectual needs more and more fully.

All this depends to a great extent on the safeguarding of peace. And, moreover, in view of the nuclear threat, the maintenance of peace has become the be-all and end-all of our day, because it determines the continued existence or the annihilation of humanity. The government of the German Democratic Republic has made peace, to which Unesco has also subscribed in its Constitution, the supreme tenet of its policy.

The most important lesson drawn from German history is that no more war, but only peace, should emanate from German soil. Ever since its foundation, the German Democratic Republic has considered this its irrevocable state doctrine.

Comrade Erich Honecker, Chairman of the GDR Council of State, has on repeated occasions expressed the conviction that the policy of dialogue and peaceful coexistence is the decisive road leading to agreements that would maintain peace for humanity, the No. 1 condition for its existence. The German Democratic Republic will actively and persistently adhere to this policy and conduct a dialogue with all forces who are committed to common sense and realism and who have the cause of peace at their heart, irrespective of differences in their political and ideological views or social and economic systems. The German Democratic Republic is thus complying with the specific responsibility deriving from its geographical situation on the dividing line between the Warsaw Pact and NATO.

The recent Berlin session of the Political Consultative Committee of the Warsaw Treaty states has, without doubt, contributed significantly to the safeguarding of peace. The global peace programme initiated by the Soviet Union jointly with the other Warsaw Treaty states tallies completely with the demand raised by millions of people on all continents that the arms race be stopped on Earth and prevented from spilling over to outer space and that radical disarmament be introduced while ensuring the principle of equal security at the lowest possible level. We advocate Comrade Mikhail Sergeyevich Gorbachev's proposal for the elimination of all nuclear weapons by the year 2000 and support any further disarmament moves insofar as they preserve the strategic equilibrium.

The German Democratic Republic supports all initiatives designed to help improve the international situation, regardless of the group of states or region from which they might come.

The proposal to eliminate medium-range missiles in Europe as a first step strengthens us in our hope that the possibilities indicated in Reykjavik will become reality. The German Democratic Republic and Czechoslovakia have given fresh impetus to the efforts to safeguard peace by proposing the creation of a nuclear-weapon-free corridor in Central Europe to the Federal Republic of Germany.

The Council of Ministers of the German Democratic Republic is very pleased to note that Unesco, too, is working to have the ideas of peace and disarmament, common sense and confidence, dialogue and international understanding prevail more than ever before. The results of your Organization's activities in combatting illiteracy and ensuring education in the spirit of peace, environmental protection or the fostering of humanity's heritage are impressive proof of the fact that Unesco is capable of making an effective contribution to the solution of pressing international problems. The safeguarding of peace for current and future generations, the guarantee of lifelong education for the people of all nations, and of the right to work and to a job according to one's qualifications are inalienable human rights. The German Democratic Republic has subscribed to these rights and raised them to the level of state doctrine.

The GDR has always thought highly of Unesco as an indispensable forum for the implementation of human rights and the development of co-operation, mutual assistance, the mediation of experience and intellectual exchanges and supported its activities accordingly. It will continue actively to put its potential in the service of the noble and humanitarian aims of the Organization as far as it is able.

Ladies and Gentlemen,

Education occupies a prominent place in our strategy for the further building of an advanced socialist society in the German Democratic Republic, adopted by the Socialist Unity Party of Germany at its 11th Congress in April 1986.

Our policies put the people first. Everything is done together with the people for the benefit of the people. This is a vivid expression of our socialist democracy. For one and-a-half decades, we have continuously

pursued our proven central policy of turning economic growth into social progress. It is geared towards the well-being of Man and the stable development of our socialist state. The citizens of our State understand only too well that great economic output is the fundamental condition for raising living standards. Increasingly higher levels of education, particularly vocational education, are necessary for this purpose, because this is the only way to cope with the new requirements of science and technology. Economic growth, which always goes hand in hand with improvements in social conditions in the GDR, demands that the people constantly renew their knowledge.

The fundamental right to work and to education are enshrined in the Constitution of the German Democratic Republic, and there are guarantees to ensure that they can be exercised in practice now and in the future. By the same token, our Constitution lays down the right and duty of every young person to learn a trade or profession, a principle that has been everyday reality for many years. School-leavers belonging to large age groups are also guaranteed a place of apprenticeship if they do not attend higher educational institutions. This will continue to be so in future. Factories and firms providing vocational education are required by law to offer their apprentices an employment contract half a year before the completion of their apprenticeship. It has been proven in the GDR that the increasing intensification of our economy through rationalization and the introduction of new technologies has neither led to a shortage of apprenticeships nor to youth unemployment.

Ladies and Gentlemen,

Vocational education has made an irreplaceable contribution to the successful development of the German Democratic Republic, has made it flourish and has strengthened it, as a socialist state. As things stand today, 64 per cent of the GDR's workforce have qualified as skilled workers or supervisors and another 21 per cent are university, college and technical school graduates. If we recall that in 1945 only 20 per cent of all working people were qualified skilled workers, that in agriculture no more than five per cent were skilled workers and that only one per cent of our women were skilled workers, then one can easily imagine what a tremendous task our State, under the leadership of the SED, had to tackle to overcome the heritage of the past and how stormily the qualification standards have risen in our country. The ten-year comprehensive school has been compulsory for all children since 1959. The high educational and qualification standards of people in this country are the decisive reason for the dynamic and sustained development of the economy which has for many years seen annual growth rates of between four and five per cent.

Pupils in our Republic aspire to become skilled workers. A skilled trade is the incarnation of high, socially acknowledged and recognized educational standards typical of the members of the working class, co-operative farmers and craftsmen today. Forming part of the all-round development of the socialist personality, profound professional knowledge, abilities and skills constitute fundamental features of life in socialist society.

Since the German Democratic Republic was founded in 1949, we have been building up an efficient system of vocational education, which is in complete harmony with the Revised Recommendation concerning Technical and Vocational

Education adopted by Unesco in 1974. It forms an inseparable part of our integrated socialist educational system combining pre-school education, general education, vocational education as well as university and technical college education. Vocational education encompasses general, polytechnical and vocational instruction based on our uniform educational aims and objectives. Invariably, we have the moulding of fully developed socialist personalities in mind. The individual sections of our educational system are constantly improved and harmonized in terms of their content for this purpose. Equal opportunity for all children - irrespective of sex, ideology or social background - free choice of career, permeability of the educational streams and the optimum development of all pupils, apprentices and students are guaranteed by this system.

Forming part of the educational system, vocational education is, concurrently, part and parcel of the national economic reproduction process. This close relationship is marked by the following features: the vocational schools run by factories and firms are government facilities; the combines are responsible for determining the content of vocational education; apprentices are working people according to their social status on the basis of apprenticeship contracts as a specific form of employment contract; apprentices fulfil production tasks contained in the economic plans, etc. Our vocational education has proved extremely advantageous in meeting the requirements of society. It helps, in the spirit of humanitarianism, educate the aspiring skilled workers in the best possible way, and contributes to a smooth transition to working life.

Ladies and Gentlemen,

The demands placed on vocational education are on an increase in the age of the scientific and technological revolution which, in its current phase, is primarily marked by the broad application of high and modern technologies. We have introduced measures in due time to prepare apprentices and skilled workers in advance for the introduction of micro-electronics, flexible automation coupled with modern information technology, new materials and processing methods, biotechnology and other new technologies. Following the careful analysis of future requirements, new curricula are being introduced for all skilled trades and professions, over the period from 1986 to 1990. In September 1986, we started to introduce the subject "Fundamentals of Automation" into instruction. Within this framework a basic informatics course will be run in modern computer labs, to be gradually established in over 25 per cent of our vocational schools for apprentices of all trades. Specific knowledge in the field of informatics needed in the individual trades and professions will be imparted on this basis.

Given the increasingly dynamic development of the productive forces, there is a strong need for continuing education. We are meeting these requirements by expanding the network and raising the quality of vocational adult education. About one in every five working people participate in an in-service training course annually at educational facilities run by firms. As a matter of principle, attendance in such courses is free of charge, no pay is lost and advantageous social solutions are found with active participation of the trade union. Preparations for the manufacture of new products and the introduction of new machinery and technology are made well in advance. Similarly, working people expand their knowledge of the

fundamentals of the general technical, technological and economic sectors, undergo refresher courses and training to prevent breakdowns in certain departments and firms. The speed of social development, notably scientific and technological progress, means that, to an increasing extent, continuing vocational education is becoming a life-time process, just as important as basic vocational education, and that an organic link between basic and continuing vocational education is emerging more and more distinctly.

Improving the content of vocational education also includes long-term career guidance, the effective organization of instruction, the wide-scale in-service education of teachers, improvement of management, planning and administration of the vocational education system and constant efforts to modernize the material and technological base of vocational schools, apprentice workshops and apprentice hostels.

So our country has available a full programme for adapting vocational education to the future requirements of our social development, the mastery of science and technology and the all-round and harmonious development of all people in the GDR. It has been co-ordinated with the aims and projects of our economy and with the improvement of all sections of our educational system.

On the whole, it can be stated that huge changes are at present going on in our vocational education. We are today organizing it with a view to the requirements of the year 2000, to suit the needs of a generation which will be the mainstay of our social development at that point in time. In our search for the best solutions, we have always taken advantage of the experience gathered by other countries. In our day, particularly, a time of stormy development, we look upon international exchanges of views and experiences as a major source of new insight, effective solutions and promising educational contents. This is why we welcome the holding of this first International Unesco Congress on questions of technical and vocational education.

Ladies and Gentlemen,

From the bottom of our hearts, we wish your Congress the best of success. The impetus emanating from the event should, first and foremost, benefit the millions of young people throughout the world, who should be assisted in obtaining their objectives in life on the basis of solid vocational education. It is with this in mind, that I should like to wish your Congress every success. I hope all the participants will have a pleasant stay in our country, eventful days in our socialist capital Berlin, as well as take home with them many good impressions of vocational education in the GDR.

**ANNEX 4 .**

**Address by Mr Akihiro Chiba  
Representative of the Director-General of Unesco**

**on the occasion of the closing of the  
International Congress on the Development and  
Improvement of Technical and Vocational Education**

Mr President,  
Mr Secretary of State for Technical and Vocational Education,  
Distinguished Participants, Observers,  
Ladies and Gentlemen,

The time has come to say good-bye to each other but I am sure all of you will agree that the past ten days during which we have worked together were one of the most profitable and significant occasions for professional educators involved in technical and vocational education. There are many factors and elements which have made this Congress one of the most memorable events in the development of technical and vocational education in the world. This is the first congress of international scale ever held in the field of technical and vocational education in the past 40 years within the framework of Unesco with the participation of over 160 eminent specialists from 64 countries. A further important factor, for which all the participants must be congratulated, is the very high qualitative, pertinent and constructive contribution each of you has made towards the success of the Congress. In this connection, Mr President, you deserve our special praise for the most excellent manner in which you guided the debates of the Congress and let me thank you most sincerely on behalf of all of us.

May I also thank the Vice-Presidents and Rapporteurs of the Congress and the Chairmen, Vice-Chairmen and Rapporteurs of the Commissions for their effective contributions without which the Congress would not have achieved such successful results.

An equally important factor for the success of the Congress is the full support and blessing of the authorities and people of the German Democratic Republic. The special honour given to us in person by Mr Willi Stoph, Chairman of the Council of Ministers, by warmly inviting us to his reception, touched all of us and it is clear evidence of the commitment of the authorities toward international co-operation and more particularly to this Congress. On behalf of all the participants, I request you, Mr President, to convey our heartfelt gratitude and best wishes to Mr Willi Stoph.

People in many corners of the world would say that the characteristics of the German people are warm-heartedness, diligence, thoroughness, perserverance, precision, discipline and efficiency, and I could go on adding many more virtues. These are exactly the qualities demonstrated by the National Organizing Committee in the planning of the Congress and in welcoming us all to this Congress.

The logistic organization, interpretation, the arrangements for the exhibition and field trips are indeed exemplary and all of us will remember the Congress with a very pleasant souvenir of Berlin 1987, which in fact coincides with the 750th anniversary of this historically prestigious city.

May I express, on behalf of all present here, our warmest thanks to the National Organizing Committee for the excellent preparation and organization of the Congress. Mr Secretary of State, you have a team of such wonderful and efficient personnel in your service and they are so pleasant and co-operative. I can see clearly why technical and vocational education is so successfully developed in your country because of their human qualities

and devotion. I should also like to request you, Mr Chairman, to convey our thanks to Mr Erhard Krack, Lord Mayor of Berlin, for receiving all of us at the magnificent City Hall of Berlin. In fact, all the citizens of Berlin have warmly welcomed us and I could witness that they are all behind the authorities, to establish the City of Berlin as a permanent symbol and site of lasting peace. We are greatly impressed by your firm determination that no war will ever start from this city. We will certainly carry home your message and tell our families, friends and colleagues about your will for peace and ask them to join in the world-wide effort for lasting peace.

Mr President,  
Ladies and Gentlemen,

However successful the Congress may be, it would become an isolated event in history unless we follow up what we discussed, agreed and recommended.

Berlin 1987 which has lit up the field of technical and vocational education in the 1980s must continue to illuminate the future path of development and show clear direction in the 1990s. You have made new acquaintances and renewed your friendship and the partnership evolved in the Congress must be carefully nurtured. Unesco will no doubt have many occasions to have your close association, in future international or regional conferences, such as the 41st session of the International Conference on Education which will discuss the theme of 'diversification of post-secondary education in relation to employment' or the 1989 International Congress on Educational Planning and Management.

You will also continue to enrich Unesco's normative action through the implementation of the 1974 Revised Recommendation on Technical and Vocational Education and some of you may actively participate in the preparation and finalization of the Convention in this field.

The Unesco Secretariat has taken note of the many useful suggestions and recommendations of this Congress and they will be reported faithfully to the Director-General. Careful review will be made to find the most effective ways and means to follow up the recommendations within the framework of the programme and budget for 1988-1989, which will be examined and approved by the General Conference of Unesco at its twenty-fourth session in October/November this year.

In fact, some of your recommendations will be carried out as soon as the proposed Programme and Budget for 1988-1989 is approved as it already foresees a number of activities in line with what you recommended. For example, the twice-yearly Information Bulletin on Technical and Vocational Education can be strengthened to play a greater role in the international exchange of information, including vocational guidance. The preparation of an illustrated technical dictionary, planned for 1988/89, will meet the wishes of many participants.

In addition to the preparation of case studies and annotated bibliographies, guides are under preparation for the use of computers in management of technical and vocational education institutions and for the evaluation of technical and vocational education curricula and courses. A prototype of course curricula for the training of computer technicians



at post-secondary level, developed in Asia, is being experimented in three institutions of other regions, and will eventually be disseminated after careful evaluation. Unesco has already developed an International Technical Illustration Bank (ITIB) comprised of technical illustrations and learning modules in sixteen different topics such as electronics, solar energy, etc. which will be useful for the national authorities to develop their own learning material in national languages.

Several activities are also foreseen for the access of girls and women to technical and vocational education, including international meetings and pilot projects.

It is equally important that the National Commissions study the conclusions and recommendations of this Congress and they will make their assessment of the priorities and importance this Congress has attached to technical and vocational education. The outcomes of such an assessment need to be appropriately reflected in their suggestions to Unesco for the preparation of Unesco's Third Medium-Term Plan, which will be the main blueprint of international co-operation within the framework of Unesco for 1990-1995.

As you are aware, resources available for international and multilateral co-operation are extremely limited. Every possible way must be found to make the optimal use of scarce resources by avoiding duplication and by concentrating on major priority programmes and actions. In this connection your outcry for more effective co-ordination both within the governments and among international agencies is most pertinent.

Many important guidelines you have outlined for the optimal use of resources will have to be kept in mind in our future action; cost effectiveness, relevance, innovation and multiplier effect, greater measures for realizing self-reliance, adaptability to rapid scientific and technological advances, to name a few.

The overwhelming concern appears to lie in the training of key personnel and teachers, and in the exchange of information. A number of useful recommendations need to be followed up and Unesco will certainly do its best to support national or regional action in this domain through its Regular Programme and Participation Programme, or through the co-operation of other funding agencies. In this connection, you are kindly requested to co-ordinate your action very carefully with other national agencies, in full consultation with the national planning and co-ordinating authorities and Unesco National Commissions. I should also like to appeal to the representatives of both bilateral and multilateral funding and technical co-operation agencies and the international non-governmental organizations present here to maintain close contacts and consultations and Unesco will be more than pleased to co-operate with you in the joint activities.

The year 2000 is approaching. If we are convinced of progress in our history we have so many unfinished tasks and duties to fulfil before the dawn of the century, which should not be passed over to the new generation of the 21st century.

Provision of education for all and democratization of education,

especially the eradication of illiteracy and the universalization of primary education will constitute a gigantic challenge for national authorities of developing countries and the international community. Democratization of education will have to be realized not only in quantitative terms but also in qualitative terms. This Congress confirmed the important role of technical and vocational education in the process of democratization of education and of society. It also provided the opportunity to reflect on its basic goals and objectives and we have been reassured that technical and vocational education will continue to contribute to human resources development, especially in the light of rapid scientific and technological progress and more importantly to development of human capacity and quality for creativity and innovation which will be vital for the realization of human dignity and self-confidence.

We have learned through history that mankind must live in partnership and solidarity based on equality and justice and I am happy to conclude that the partnership in technical and vocational education is clearly evident and Berlin '87 has given us the confidence and determination for further development.

## ANNEX 5

List of Participants/Liste des ParticipantsI. PARTICIPANTS FROM MEMBER STATES/PARTICIPANTS DES ETATS MEMBRES

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## ANNEX 6

LIST OF DOCUMENTS

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