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HIGH-LEVEL ASSISTANCE TO IDENTIFY ALTERNATIVE STRATEGIES FOR TECHNICAL TRAINING IN THE ELECTRONIC INDUSTRY

SI/MAT/90/801

MALTA

Terminal report

Prepared for the Government of Malta
by the United Nations Industrial Development Organization,
acting as the executing agency for the
United Nations Development Programme

Based on the work of Comerint, consulting firm

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United Nations Industrial Development Organization

Vienna

Explanatory notes

Besides the common abbreviations, symbols and terms, the following have been used in this report:

CAD	computer-aided design
CAM	computer-aided manufacturing
CNC	computer numerically controlled
ESTS	Extended Skill Training Scheme
ETC	Employment Training Corporation
HRD	human resources development
HRNC	Human Resources National Committee
ITU	Instructor Training Unit
NCVQ	National Council for Vocational Qualifications (United Kingdom)
NTA	National Training Agency
NVQ	National Vocational Qualifications (United Kingdom)
OTD	operator technical diploma
TAS	Technician Apprenticeship Scheme

Figures and graphs have not been edited.

CONTENT

INTRODUCTION

A. Project background

The Maltese Government is experiencing a serious shortage of qualified manpower for promoting and sustaining the development of advanced technologies.

Considering the size of the country and its labour supply, the Government of Malta intends to concentrate its industrial activities on high manufacturing value-added sectors, which generally implies capital-intensive, high-tech, quality-oriented and skill-intensive industrial enterprises. The electronic industry emerges as one of the preferred sectors, but by no means as the only one.

Even though the efforts of the country in the field of education and training have been and continue to be intensified, they seem to be insufficient in some areas. The need for qualified industrial manpower is continually growing, given the country's efforts to attract foreign investment.

Following consultations between representatives of Malta's political and industrial domain and officials of UNIDO, the Maltese Goverment requested UNIDO for assistance in the elaboration of a programme that would provide a strategic technical skills training capability to service the Maltese industry.

The project "High-level assistance to identify alternative strategies for technical training in the electronic industry" was approved in early 1990. The initial focus on the electronic industry has widened during project implementation as all high-tech industries were found to deserve the same attention in terms of human resource development.

B. Objectives and workplan

The objectives of the project were:

1. **Training needs**: To assess the immediate and projected demand for highly skilled staff for the electronic industry.

2. **Training delivery system**: To investigate the actual situation of the training delivery system, both educational and industrial, with special regard to occupations in the electronic industry.

3. **Training strategies**: To suggest alternative strategies to close the gap between the training demand and the training offer.

The phases of the project were planned as follows:

(a) Survey in Malta (analysis);

(b) Study of outcomes (assessment);

(c) Interim report (findings and recommendations);

(d) Discussion with Maltese government representatives at Vienna;

(e) Final report.

C. Implementation

On the basis of the terms of reference contained in the project document, two consultants were fielded on 2 April 1990 to conduct a two weeks' survey in Malta. They were assisted by personnel of the Malta Development Corporation, and based their investigation on the following sources of information:

(a) Relevant existing documentation;

(b) Two questionnaires, one administered to the electronic and sup - porting industries and the other to technical institutes;

(c) A series of structured interviews (around 20), aimed at collecting information from key persons in the electronic and supporting industries, in educational and training institutions and in public institutions and associations concerned;

(d) Meetings and interviews, towards the end of the survey period, with selected knowledgeable persons in order to exchange ideas and verify relevant information.

Some problems were encountered with the questionnaires due to delays in the mail, short time for filling the questionnaires, and lack of personnel for reaching all respondents to whom questionnaires were sent. Nevertheless, the questionnaires returned constitute a significant sample for the information sought, especially with regard to the training delivery system.

More fruitful was the collection of information and ideas through interviews and group discussions with experienced and knowledgeable persons, and the study of the documentation available.

All in all, the mission has permitted the consultants to define the problem more stringently as a basis for their recommendations.

The two consultants also visited various industries and training institutions in Italy and in the United Kingdom (see annex I), to widen their basis of comparison with advanced paradigms of emerging skills and training solutions.

An interim report has been the basis for a fruitful discussion between a delegation from Malta, the consultants and officials from UNIDO at a four days' meeting held in Vienna at the end of May 1990, during which the report was refined, the relevance of the proposals double-checked, and the outline of an action plan drafted.

I. FINDINGS

While a number of problems and shortcomings will be discussed in this chapter, the consultants would like to stress that the overall impression gained during their visit to Malta is positive.

In Malta both the economic and the social spheres are dynamic and open to innovation. The local industry features certain aspects of advanced technology and produces high-quality goods. Many good ideas can be found and there is a clear understanding of problems. Basically, there is a widespread desire to improve and the potential to obtain better results exists.

As to human resources, the situation is not as dramatic as it might appear. Certainly, much needs to be done to meet the challenge of ongoing and future development, but the Maltese workforce can be considered a valuable asset, because there is a high degree of adaptability and a potential for improvement. The Maltese are right when they feel that they can dare and afford more on the international market.

A. Choice of the right method to obtain the required competences

The experts found that in the electronic and other high-tech industries there is, at least at present, no emergency situation in terms of lack of skilled manpower or shortage of technical skills. Certainly a need for highly skilled technicians will arise in the future, as new high-tech industries will be established or existing ones move to higher automation and advanced technologies.

In such perspective, the problem is not so much one of getting skilled personnel per se but rather one of choosing a suitable approach and method to produce the relevant skills at the right time. In other words, there is a crucial need to improve and innovate the overall skill-production machinery, i.e. education and training, including the capability to analyse and define what skills will be needed in the short and long run by the labour market. The requirements of the labour market should be the guiding principle for the training delivery system.

It is understood that not all skilled manpower must or can be produced locally and a need for overseas' training and exposure will always remain. However, there is a marked difference between "blind" dependence and the competent decision about what kind of training should be done abroad and where. The latter requires specially qualified staff.

B. Industrial training in Malta 1/

Industries based in Malta do not have, but for a few exceptions, established training systems, services, sections or centres.

Where some forms of off-the-job training exist, such training is not carried out on a professional basis. Job analysis, training needs analysis and diagnosis, course design, instructional unit design and planning, courseware preparation, use of audiovisual media, evaluation of results etc. are rarely used.

On-the-job training, where provided, is generally not systematically planned and monitored.

Some companies send their personnel abroad for training, but obviously as an ultimate solution and on a very limited scale.

1/ The term "industrial training" is being used in a wider sense, including training of newcomers and of already working personnel from any organization, be it industrial, commercial, service or public administration. It is to be distinguished from education, particularly technical education and school-based vocational training.

Other forms of in-service practices to improve skills, attitudes and knowledge, such as job rotation, job enrichment, project assignment, attachment, secondment, exposure to external learning situations etc. are rarely applied.

In Malta, there is no external institution or company providing courses or consulting services for technical training addressed to employed personnel. Furthermore, no institution exists that provides courses on industrial training methodology (training of trainers), with the exception of seminars on some pedagogical subjects at the University and the Instructor Training Unit (ITU) which, on a small scale and with limited resources, principally covers the training of trade-school instructors.

Managerial training is offered by MISCO, Malta University Services, FOI, Chamber of Commerce, government-controlled organizations and others. However, such training:

(a) Is done on a small scale and does not quantitatively cover the real training needs in that field;

(b) But for a few exceptions, consists of a ready set of courses which are not customized;

(c) Principally covers only classic managerial themes such as communication, motivation of personnel, introduction to cost accounting and finance for supervisors and the like;

(d) Is normally of a very short duration, making the attainment of skills questionable. There have been exceptions, but without great impact on the general pattern;

(e) Is not always suitable for the Maltese industrial and cultural environment, which may imply that training provided could be even detrimental to specific work organizations of the country.

C. The role of technical education and school-based vocational training

Industries, with a few exceptions, seek to employ workers who already possess all required skills and knowledge and tend to rely on the educational system, which feels the pressure, tries to respond to a certain extent, but cannot really comply with a demand for such specific skills.

The confusion betweeen technical education and industrial training must be dispelled. The role of technical education is to provide a general technical preparation for various occupational categories, geared to the demand on the labour market. From there on, training for specific specializations, processes, equipment and procedures or the continuous upgrading of skills is the task of industrial training. Obviously, there is some overlapping between the two.

D. Human resources management and development practices

Generally speaking, there is no "culture" of modern methods and practices of human resources management and development such as manpower planning, career development, job grading, performance appraisal, potential assessment, training, and so on.

Moreover, there is no "merit system" for advancement, or at least it is not the rule. Incentives and motivational tools are mostly based on a paternalistic pattern.

For the above reasons, whatever the entrance preparation of the employees, their productive value is not properly exploited and enhanced once in the job. Certainly, an improvement in this area would greatly contribute towards the total asset of skilled manpower.

E. Management skills and industrial/business orientation

Overall, school qualifications are not missing; technical skills may have to be improved, sometimes in quantitative terms and sometimes in qualitative terms (improved performance or new skills). What appears to be a general complaint is the lack of managerial skills and industrial/business orientation of middle managers and often also of senior management.

The managerial skills and attitudes required are:

(a) Skills of social interaction, such as communication, motivation of workers, teamwork, leadership etc.;

(b) Knowledge, skills and attitudes in the economic and financial disciplines, to render a company a profit-making undertaking: cost-effectiveness of production, budgeting and cost-accounting, cost of accidents and breakdowns etc.;

(c) Organizational skills and knowledge like planning and scheduling, work procedures, management of an information system, company's organizational structure, roles and job descriptions;

(d) Intellectual knowledge and general, complex skills such as problem solving, learn-how-to-learn, transfer of know-how and teaching skills.

F. Instructional methods and examination system at schools

There are many complaints in the industrial environment about the preparation of secondary school graduates (11 years of schooling). It appears that frequently they are "functionally illiterate", i.e. they are poor speakers, communicators, report writers and document readers. In addition, they are not accustomed to work in a team or to relate functionally with others.

One of the principal causes of the problem may be traced back to the school examination system and the instructional methods. Students have to pass examinations which are generally written exams and in the form of tests. Most of them are prepared by or for an overseas' certification body. The result is that students learn how to pass a test or a quiz. Moreover, instructional methods are teacher-centred and not learner-centred; they are based on individualistic study and on the adherence to the programme or subject matter and not on skill acquisition. It is not a surprise that social skills, teamwork, oral communication or writing skills are not learned at school.

Instructional methods and the emphasis on process and programme do not change much in higher education, and this partly explains the shortage of social and managerial skills once the students enter working life.

G. The role of curricula, syllabi and certification devised abroad

Excessive reliance by the school system on curricula, syllabi and examination patterns devised overseas (G.C.E., C & G, BTEC, E.E.B. etc.), though very useful as a reference paradigm and a resource-saving measure, is somehow detrimental to the educational system in so far as it does not always fit the Maltese exigencies and discourages the development of a locally based curriculum or instructional design capability.

Customization is possible and to a certain extent practiced, but the lack of a curriculum development culture often leads to a customization depending more on the capabilities of the teaching staff than on the educational needs of the Maltese economy.

In the United Kingdom, the certification system is undergoing a major transformation under the lead of the National Council for Vocational Qualifications (NCVQ). Following a report on vocational qualifications in England and Wales (1986), a Government White Paper set the outline for the change. The widening gap between the training delivery systems and the requirements of the labour market was pointed out as a major weakness of the existing system.

The system which is being introduced is based on two principles, namely competence-based qualifications and employment-led setting of standards of performance. All awarding bodies and training institutions must re-orient their actions and programmes, taking as a reference the newly elaborated national vocational qualifications.

The new system is intended to be dynamic and to be modified with time and experience, adapting it to changes in the environment, job opportunities and constraints. Simply cloning the system to Malta would be very naïve; however much may be learned from that experience.

H. Effectiveness of apprenticeship schemes

The effectiveness of apprenticeship schemes, namely the existing Extended Skill Training Scheme (ESTS) and the incoming Technician Apprenticeship Scheme (TAS) is questionable. Under the present arrangements, apprentices spend up to six months per year in a sponsoring company. In principle, this is a good approach in as far as the companies could provide a sort of "learning by doing" and industrial exposure. That arrangement could also compensate the lack of industrial training during the first phases of the working life of staff; however, there is no method, poor organization and very little control.

In addition, the scheme has the following shortcomings:

(a) The time spent in the company (either 6 months per year or 3 days in school and 2 days at work) is excessive for a scheme that is considered "educational", because it does not leave enough time for basic instruction nor add much to practical skills;

(b) Apprentices rarely receive any structured form of training, including monitoring and guidance, and are often used as cheap labour;

(c) There are no trained tutors or assigned experts to instruct the apprentices and to assess their performance as well as the efficiency of the training structure.

The Ministry of Education is aware of the many weaknesses of the schemes, and has plans and ideas of how to improve their effectiveness, e.g. by introducing a better planning and monitoring system, by assigning trained tutors either from industry or from the educational sphere in cases where industries are too small to provide these themselves, by establishing an external body to assess results etc. These ideas and plans are still to be implemented.

Moreover, there is a strong need for integration and coordination between the various actors in the schemes: the Ministries of Education, Industry and Social Policy; trade schools; technical institutes; industries; FCI and apprentices.

I. Shortage of professional training staff

The real bottleneck in the training delivery system is the shortage of trained and professional staff for technical education, school-based vocational training and, even more, for industrial training. This regards teachers, instructors and tutors, both in terms of subject matter (contents) and instructional methods, and, most importantly, other crucial professional profiles of any well-geared industrial training system, such as training managers and coordinators, job analysts, experts in training methodology, curriculum developers or instructional designers, courseware designers, audiovisual experts, on-the-job training specialists, trainers of trainers, training needs analysts, training evaluation and testing experts and computer training specialists.

In addition, motivation is a great problem amongst teachers and training staff at all levels, from university down to trade schools and other schools. Status, top-down support, means, resources, and above all material incentives are at a very low level. It is not appealing to embark in the education and training careers.

J. Discrimination against technical education

Until recently, academic streams (lyceum or sixth form) received a stipend, and the technician streams did not. Things will change with the introduction of the Technician Apprenticeship Scheme.

To enter the sixth form line, a student must have six "O" level passes, but in order to join any technical institute, three or even fewer passes are enough. Parents and students therefore perceive technical studies as a second-best choice.

For university studies, a technician has to spend 4-5 years in a technical institute after completion of secondary school, while after the sixth form path (lyceum), only 2 years are sufficient.

The situation is further worsened by a traditional attitude of the Maltese population by which industrial jobs are considered inferior to occupations in public services and administration or commercial enterprises, even though the remuneration may be comparatively lower. Generally speaking, there is a white-collar and job-security syndrome, coupled with an overemphasis of academic and

university studies, supposedly leading to higher status and career chances. A good deal of information and public relations work will be needed to dispel existing prejudices and to highlight the opportunities that technical education and industrial careers can offer.

K. Women in technical occupations

There are practically no women enrolled in technical studies or pursuing industrial careers. This represents an untapped source of valuable staff considering that women sometimes excel men in a range of technical occupations, such as scientific work or high-tech jobs.

The Ministry of Education is fully aware of the problem and plans to increase the intake of women to technical studies; among others, the establishment of a technician-level course of studies for electronic servicing is planned.

L. Malta's industrial workforce

Like in many industrialized countries, there are basically two levels of workers:

(a) The executor level, which requires little investment in training;

(b) The highly skilled level, which requires great investment in training.

The second group deserves particular attention as it is increasingly becoming a strategic resource for business success, especially in high-tech industries.

The executor-level workforce deserves the provision of learning opportunities in order to give keen and willing personnel a chance to upgrade their level of skills.

M. Exigencies of the high-tech industry in terms of skilled manpower

What the high-tech industry needs is a flexible and versatile technician, with a broader and somewhat different background than the present one. It is not a quantitative but a qualitative issue and concerns especially holders of a higher technical diploma. Electronic, mechanical and electrical technicians are a case in point.

Electronic technicians should, for instance, also be able to perform simple mechanical and electrical tasks, to service pneumatic and hydraulic measuring and control devices, and to look after the installation and routine servicing of automation software. Mechanical technicians should be able to adapt themselves to automated processes, CNC machinery, and understand the basics of electrotechnics and computer-controlled processes and machinery. Electrical technicians must have a rather good base in industrial electronics. Besides, they all should be fairly well skilled in teamwork, trouble-shooting, communication and planning, and demonstrate creativity and initiative.

Thus, the desired product of the educational system is a technician who is flexible and capable of quickly adapting to changes in working roles, a

quick learner, able to work in a team, to transfer his know-how to others and to contribute actively to the innovation processes. Additional and continuous in-house training and self-study should enable such workers to perform a wide range of functions and duties.

Holders of operator technical diplomas (OTDs) are of lesser importance for high-tech industries and are often used as cheap labour.

The number of university graduates in technical disciplines as well as their qualification are satisfactory, except for the aforementioned lack of managerial skills.

The Fellemberg Institute, which turns out industrial electronic technicians, can well cope with the demand, particularly if assisted by the Swiss Government. At present, the occupational profile is being redefined according to industrial needs, and curricula and syllabi are being revised accordingly. All training staff will undertake training courses in Switzerland. Moreover, the Institute's curriculum already provides for a broader background, i.e. electronic with mechanical skills. Missing are especially pneumatics, hydraulics and industrial computing.

The capacity of the Institute could be easily increased, provided that new staff and equipment were supplied. For the present intake, which has recently been increased from 20 to 40, new equipment, programmed exercises for the 3rd and 4th year, and some additional training of trainers (curriculum development, courseware design etc.) is needed.

The Institutes of Paola, Naxxar and Gozo meet the demand for mechanical and electrical technicians in quantitative terms. Action has to be taken to improve the quality of the teaching staff, of curricula and syllabi, equipment and the relationship with the labour market.

Training for other occupations required by industry, which must be taken into consideration by technical education, especially when the demand becomes consistent, are:

(a) Toolmakers, mouldmakers, diemakers at the operator and higher technical diploma level. (The establishment of a precision engineering centre is being considered, which could cope with these occupations);

(b) Refrigeration technicians;

(c) CAD/CAM designers;

(d) System analysts;

(e) Chemical laboratory technicians;

(f) Technological laboratory (measuring, testing and certification) technicians.

N. Coordination between all parties involved in training for the industry

There is a problem of communication and coordination between all institutions concerned with the training and development of human resources, i.e. various ministries, FOI, industries, university, institutes, parastatals etc.

One does, here and there, find a clear awareness of problems, plenty of good ideas and plans, and a general goodwill of all parties; but everything seems to be done in isolation. Islands within the island, this is the feeling the consultants got when touring the various organizations in Malta. The only efficient channel of communication appears to be personal contacts.

Malta's industries tend to be self-sufficient or linked by an umbilical cord to their parent companies abroad. There is no merge of services, very little reliance on local suppliers and scarce exchange of information. The same applies to public institutions: fragmentation of efforts, poor coordination, overlapping, misunderstandings, sometimes even ignorance of what the others do.

As to human resources, this often implies a wastage of resources, missing of opportunities and scattered initiatives while the country's economic and social development goals require, more than ever, a leap forward in skilled manpower development and, therefore, a well-conceived, synergetic and coordinated effort on the part of all parties concerned.

II. RECOMMENDATIONS

The overall objective of the project being the improvement of the training capacity and capabilities of the country in order to cope with the increasing demand for highly skilled technical personnel, the guiding principles of any action to meet that objective should be:

(a) Delegation of authority and support from the top for devising and implementing training policies, structures and activities;

(b) Close coordination between all parties concerned;

(c) Emphasis on competence-based training to produce professionally competent staff;

(d) Consideration of human resources as the keystone for a rapid economic development of Malta;

(e) Improvement of the methods for providing efficient, effective and job-oriented training;

(f) Development of a capability to "govern" training innovation from Malta and to choose, where necessary, outside training services and products;

(g) Creation of a multiplier effect in training competences by the inclusion and adequate preparation of managers and other persons with special know-how;

(h) Involvement of employers in policy issues and the planning of training;

(i) Development of flexible training resources which can respond to short-term training needs.

Moreover, the following two facts must be taken into account in the aim to achieve an improvement of the training system:

(a) The small number of persons to be trained for specific occupations;

(b) The lack of standards, models and procedures for the development of human resources.

The population of Malta is 350,000 and the labour supply 130,000 persons, of which only 32,000 are employed in the manufacturing industries. With the existing diversified industrial setting, the number of persons for any occupational group is small and quickly saturated by specific training schemes.

Consequently, the target model should be a multi-skilled, flexible and versatile worker, capable of filling multi-functional roles and of moving within organizational and technological settings.

It also implies that more consideration should be given to the real employment demand, in a dynamic and flexible way, so as to offer the right skills at the right time and at the right place. This entails greater cost at the outset, but in the long run, savings of money and resources can be achieved.

As to standards, models and procedures for human resources development, exposure and familiarization with overseas practices will be necessary in order to develop a systematic approach for Malta. This applies, for example, to new training methods or new management techniques.

Recommendations

1. Establish a Human Resources National Committee (HRNC), in which all institutions concerned shall be represented, bestowed with the authority of deciding on policies, organization, structure, resources and procedures regarding the human resources endowment and development on a national level, including education, industrial training and human resources development policies and practices. A draft outline of the composition and functions of HRNC is given in annex II.

2. Set up a National Training Agency (NTA). The idea is not new because the establishment of a similar entity, namely the new Employment Training Corporation (ETC), is presently underway within the framework of the new Employment Services Act. NTA, functionally accountable to and backed by HRNC, will be concerned with industrial and managerial training and the diffusion of human resources management and development methods and techniques. The functions of NTA are given in annex III.

3. Strengthen the Instructors Training Unit (ITU) which is concerned with training methods and aids, and the training of trainers for the technical education system. Close collaboration between NTA and ITU must be ensured by the integrating role of HRNC.

4. Define the roles of and interrelationships between technical education and industrial training.

5. Introduce in the educational system:

(a) Learner-centred instructional methods;

(b) Participative methods, such as role-playing, case studies, group work, micro-teaching by students to students, brainstorming, individual and group projects etc. with the aim of activating students and rendering them responsible for their own process of learning;

(c) Social skills training;

(d) Group study;

(e) Training in complex, general skills such as learn-how-to-learn, problem-solving, trouble-shooting, project work, negotiating, report writing and so on;

(f) Audiovisual media: hardware, software and the competence to exploit them;

(g) Oral examinations and better tuned and updated performance tests;

(h) Curriculum development and instructional design capabilities, from macro programmes to single units of instruction and practical exercises.

The latter point is the most important one, because curriculum development should reflect the societal and economic needs of Malta. Young people should be better prepared for work, in whatever field. In the case of industry, they should be benefiting from curricula which provide them with the necessary skills, attitudes and orientations for employment in a constantly developing industrial environment. Moreover, with respect to manpower endowment and development, curricula must reflect the Government's economic and social strategies and policies.

6. Shift the orientation of technical education from certification (passing of exams) to the acquisition of competences.

7. Eliminate any discrimination between academic and technical studies and influence the public opinion regarding industrial jobs and technical studies.

8. Create favourable conditions for women to engage in technical education and industrial careers.

9. Foster managerial training, in general.

10. Induce industries to play (and pay) their part in the building-up of a reliable and skilled labour force, particularly in the area of in-service training.

11. Redesign the apprenticeship schemes in terms of objectives, proportion of time spent in school, organization, methods, control and professional resources.

12. Refurbish the training equipment of the trade schools and technical schools.

13. Foster the impact and effectiveness of the Guidance and Counseling Services of the Education Department, especially as regards technical education and industrial careers.

14. Improve recruitment, remuneration and conditions of work of managerial and teaching staff of the public education and training system, trying at the same time to move towards a younger and higher qualified staff.

15. Strongly push towards the improvement of methods and organization of the training delivery system, both educational and industrial, with special attention to the training and updating of trainers.

16. Establish a cadre of teaching staff that will be the propagators of new technologies.

17. Improve the relationship between University and the productive sector for reciprocal benefit.

18. Improve the system of evening classes for workers.

19. Foster measures for crash training programmes for workers who need to be redeployed.

20. Take advantage of the know-how available in the country, by creating a framework that would permit to use persons with special know-how as part-time instructors, tutors for on-tne-job training, technical advisors for curriculum development and courseware preparation etc.

III. PROPOSALS FOR FURTHER TECHNICAL ASSISTANCE

It is suggested that any future technical assistance be sought under the following premises:

(a) The Maltese should be enabled to improve their training system with their own human resources. Outside assistance shall therefore contribute towards their self-reliance;

(b) Efforts should concentrate on the approach to and methods for education and training and on the enhancement of the professional qualifications of all staff concerned with training at the managerial and instructional levels.

The options presented below are in order of priority, also considering a scaled order in funding provisions. Option 1 is considered the best solution for a long-term improvement of the situation.

A three-year time-span of assistance is recommended and only one Maltese counterpart is envisaged.

OPTION 1: METHODOLOGICAL ASSISTANCE

A. Consultants

Consultants are to be engaged for an established period of time, in terms of man-years, and deployed to the National Training Agency. The type of experts and the duration of their assignment shall be further discussed with the Employment Training Corporation. The type of experts required are indicated below, under two suboptions.

A precondition of such assistance is the presence of Maltese specialists or other qualified personnel, equipped to assimilate the know-how from the foreign experts.

Remuneration and travel shall be at the expense of the financing institutions. The Maltese Government shall pay for accommodation and living expenses as well as for other local expenses.

Suboption A1: ideal team

	Man-years
Expert in human resources development	2
Expert in industrial training	2
Instructional designers	1
Job analysts/researchers (for establishing an "observatory on the labour market and technological innovation")	3
Media specialist	1
Expert in managerial training	1
Informatics specialist	1
Total	11

Estimated costs:

$US

11 man-years x 12 months x $US 12,000 = 1,584,000

25% extra costs   396,000

Total   1,980,000

Suboption A2: key-resources team

	Man-years
Expert in human resources development	2
Expert in industrial training	2
Job analyst/researcher	2
Total	6

The job descriptions of those three experts are contained in annex IV.

Estimated costs

$US

6 man-years x 12 months x $US 12,000 = 864,000

25% extra costs   216,000

Total   1,080,000

B. Courses in training methodology for trainers

The following courses are suggested, spanning over a period of three years:

    2 courses for training managers
      Duration: 6 weeks
      Minimum number of participants: 8
      Maximum number of participants: 15

    3 courses for instructional designers 1/
      Duration: 12 weeks
      Minimum number of participants: 10
      Maximum number of participants: 15

    4 courses for instructors/teachers
      Duration: 2 weeks
      Minimum number of participants: 12
      Maximum number of participants: 15

There is again a choice between two suboptions: courses fully abroad, or courses in Malta with a two-week overseas' study tour for training managers and instructional designers.

The estimated costs for the two options are given below.

Suboption B1: training abroad

	$US
Living and other students expenses abroad	
56 weeks x 7 days x 15 persons x $US 150 per day	882,000
Delivery (teaching and logistics)	
56 weeks x 5 days x $US 2,000 per day	560,000
Course design and training material	300,000
Air tickets (135 persons)	166,000
Study tours	80,000
Total	1,988,000

1/ One of these courses will be dedicated to the development of competences in computer-based training, in order to create the first group of Maltese experts capable of exploiting advanced training technology.

Suboption B2: training in Malta with study tours abroad

	$US
Delivery of courses	
56 weeks x 5 days x $US 3,000 per day for 2 persons	840,000
Course and training material	300,000
Living and other expenses for study tour participants	
15 days x 75 persons x $US 220 per day	247,500
Air tickets	100,000
Internal transport (abroad)	30,000
Fees of host training institutions	100,000
Total	1,617,500

OPTION 2: COURSES ABROAD FOR TECHNICAL INSTRUCTORS IN NEW TECHNOLOGIES

The objective of this option is to contribute towards the improvement and updating of technical instruction within the vocational training system.

It involves formal courses, study tours and attachments to leading institutions in the specific field required. The average duration of such training activity is about three months. It may take place on an individual basis or, preferably, in small groups.

It was assumed that 30 instructors would be trained over a period of three years, so that 90 man-months would have to be budgeted.

Specific fields, candidates, programmes and host institutions shall be selected according to needs and agreed upon by the interested parties.

Estimated costs:

	$US
Living and other expenses abroad	
90 months x 30 days x $US 220 per day	594,000
Courses	
90 months x 22 days x $US 300 per day	594,000
Air tickets (75)	90,000
Total	1,278,000

OPTION 3: COURSES ABROAD FOR TECHNICIANS FOR THE ELECTRONIC AND
HIGH-TECH INDUSTRIES

These are post-diploma or post-graduate technical courses, which cover a time-span from 2 to 3 weeks up to 2 to 3 months, and, as a general rule, the entry requirement is a higher technical diploma.

This option may be implemented through individual attendance to catalogue courses, or by means of specifically organized (catalogue) courses, adapted for a Maltese group.

It has been foreseen to train 90 technicians in three years, for which 540 man-weeks would have to be budgeted.

Estimated costs:

	$US
Living and other expenses abroad	
540 weeks x 7 days x $US 220 per day	831,600
Courses	
540 weeks x 5 days x $US 300 per day	810,000
Air tickets (100)	120,000
Total	1,761,600

OPTION 4: INTENSIVE INSTRUCTIONAL METHODOLOGY TRAINING FOR
TEACHERS AND PROFESSORS OF THE EDUCATIONAL SYSTEM

This proposal deeply involves the entire academic system and is therefore to be carefully examined and scrutinized since all possible effects are to be considered.

The proposal entails improving the training methodologies and techniques, according to the following lines:

(a) From teacher-centred to learner-centred instruction;

(b) Introduction of active/participative methods: learning-by-doing, role-playing, brainstorming, group work etc.;

(c) Use of audiovisuals;

(d) Social skills training;

(e) Formative evaluation and not only summative evaluation (exams);

(f) The teacher as a designer of his instructional units;

(g) Precise definition of learning objectives;

(h) Control of learning results.

The courses shall cover a two-week period that may be either consecutive or spread out. These courses would initially be held by foreign instructors together with local instructors; at a later date the local instructors should be able to deliver the courses.

Although the intervention is technically simple, it must be carefully prepared because it will have an effect on curricula, examinations, organization and expectations. If this proposal is accepted, a trial run is suggested.

External contribution may, in this case, be limited to the following:

	Man-months
Study and definition of the actual interventions and of the seminars and workshops to foster appropriate responsiveness	7
Preparation of teaching material, printing and editing	4
Holding of 6 experimental courses	4
Adaptations	3
Project management	2
Total	20

Estimated costs:

	$US
20 man-months x $US 12,000 per month	240,000
25% extra costs	60,000
Total	300,000

OPTION 5: SUPPLY OF EQUIPMENT, TEXTS, COURSEWARE AND SOFTWARE

This option would comprise the following:

(a) Completion and updating of the teaching equipment at the Fellemberg Institute;

(b) Supply of particularly important equipment for advanced technology to the Paola, Naxxar and Gozo Technical Institutes;

(c) Supply of texts, courseware, software and computer-based programs to the Resource Centre of the National Training Agency. Possibly, personal computer stations could be supplied for computer-based training and audiovisual hardware (video recorders, overhead projectors, cassette recorders etc.);

(d) The same as above, for the Resource Centre of the Instructor Training Unit.

For this option, preciser information has to be gathered.

SUMMARY OF COST ESTIMATES OF THE VARIOUS OPTIONS

Option 1: methodological assistance

		$US
Consultants		
Suboption A1:	ideal team	1,980,000
Suboption A2:	key-resources team	1,080,000
Courses in training methodology for trainers		
Suboption B1:	training abroad	1,988,000
Suboption B2:	training in Malta with study tours abroad	1,617,500
Option 2:	courses abroad for technical instructors	1,278,000
Option 3:	courses abroad for technicians for the electronic and high-tech industries	1,761,600
Option 4:	intensive instructional methodology training for teachers and professors of the educational system	300,000
Option 5:	supply of equipment, texts, courseware and software	Not evaluated

SUGGESTED PHASING OF IMPLEMENTATION

During the meeting held at Vienna in May 1990, it was suggested to implement options 1 and 3 on a priority basis, specifically the following;

Suboption 1.A2:   methodological assistance – key-resources team
Estimated cost: $US 1,080,000

Suboption 1.B2:   methodological assistance – courses in training methodology for trainers, held in Malta with study tours abroad
Estimated cost: $US 1,617,500

Option 3:   courses abroad for technicians for the electronic and high-tech industries
Estimated cost: $US 1,761,600

The other options may be implemented at a later stage.

Annex I

INDUSTRIES AND TRAINING INSTITUTIONS VISITED BY THE CONSULTANTS

In Italy

Istituto Internazionale Agnelli
Corso Unione Sovietica 312
10135 Turin

ILO
International Centre for Advanced Technical and Vocational Training
125, Corso Unitá d'Italia
10127 Turin

Istituto Salesiano S. Zeno
Via Don G. Minzoni 50
37138 Verona

Politecnico di Torino
Corso Duca degli Abruzzi
00128 Turin

Philips
Via Philips 1
20052 Monza (Milan)

Seleco S.p.A.
Viale Treviso 15
33170 Pordenone

Olivetti
Via Jervis 77
10015 Ivrea (Turin)

Istituto per lo Sviluppo della Formazione Professionale
  dei Lavoratori (ISFOL)
Via Bartolomeo Eustachio 8
Rome

Hay Management Consultants
Via Legnano 6
20121 Milan

In the United Kingdom

National Council for Vocational Qualifications
222 Euston Road
London NW1 2BZ

National Council for Education Technology
3 Devonshire Street
London W1N 2BA

Sheffield Skillcentre
Richmond Road
Sheffield S13 8HT

Blackpool and the Fylde College
Ashfield Road
Bispham Blackpool, Lancashire FY2 OHB

Annex II

HUMAN RESOURCES NATIONAL COMMITTEE

Justification

The Human Resources National Committee (HRNC) shall have decision-making, public relations and information, and coordinating functions, in all matters concerning Maltese human resources endowment and development, with the aim of furthering the economic development of the country, at the same time caring for a balanced social and cultural advancement of the population as a whole as well as of the individual citizen.

HRNC shall focus on the education and training delivery system, as well as on any form of human resources development which could enhance the quality and availability of the Maltese workforce.

Three conditions are essential for the success of the Committee, namely:

(a) Authority over all parties concerned;

(b) Participation of all relevant parties;

(c) Existence of a reliable subordinated decision-making technostructure, able to devise options concerning policies, procedures, facilities, methods, funding, staff requirement and qualification, and schemes of implementation and technical assistance.

The above-mentioned technostructure shall consist of two bodies with their own specific aims and functions, but cooperating as closely as possible under the guidance of HRNC:

(a) The Education Innovation Unit, which will represent the educational environment and will be attached to the Ministry of Education;

(b) The National Training Agency, which will represent economy and labour market, and shall deal particularly with industrial and managerial training, employment problems and human resources development methods and practices. It will be part of the Employment Training Agency accountable to the Ministry of Social Policy.

Hence, the two bodies will be functionally subordinated to HRNC, and hierarchically to their respective Ministries.

Composition

The Committee shall be chaired by the Prime Minister or by his authorized representative.

It shall be composed of:

(a) Representatives of:

> Ministry of Industry
> Ministry of Education
> Ministry of Social Policy

FOI
Chamber of Commerce
Employment Training Agency
Trade Unions

(b) A Permanent Secretary, appointed by the Prime Minister upon suggestions of the Committee, who shall act as the permanent point-of-reference and prepare and coordinate the sessions;

(c) Representatives of the following bodies, invited according to the relevance of their presence for a specific topic:

The University
Trade and technical institutes
Private managerial and industrial training companies
Academic schools
The Association of Engineers
The National Council of Science and Technology

A part-time secretariat function, accountable to the Permanent Secretary, shall be provided by the Prime Minister's office.

Functions

Decision-making functions

HRNC shall submit to the Government for approval, on a regular basis or upon request, authoritative views on:

(a) Changes, adjustments and innovations to be introduced in the education and training delivery systems, as well as in in-house human resources development policies and practices;

(b) Mobilization of resources necessary for establishing short-, medium- and long-term programmes in the economic sectors of the country;

(c) Proposals on policies, procedures, facilities, organization, funding, methods, schemes and programmes in education, training and human resources development;

(d) Proposals on staff requirements, conditions of work, remuneration and training of personnel in public education and training institutions.

Public relations and information functions

HRNC shall assure that information is properly gathered and conveyed to the Government and all interested parties, on all relevant issues regarding the human resources assets of the country, such as:

(a) Development of offer and demand on the labour market, on the basis of a comprehensive and comprehensible classification of vocational qualifications and the information gathered by a permanent observatory of the labour market;

(b) National industrialization problems, especially in respect of technological innovation, market trends, changing work organization and other

developments that could affect the human factor in terms of availability, skills requirements and short- and long-term personnel development needs;

(c) The state-of-the-art of methods and tools for manpower planning and development, i.e. for providing the right skills, in the right number, at the right moment and in the right place;

(d) The evolution of methods and schemes for education and training in highly industrialized countries.

HRNC shall further ensure:

(a) Comprehensive information through public media, press and direct briefings on all new schemes, directives, programmes, innovations etc. to be introduced;

(b) The organization of meetings, debates and workshops to discuss and share problems and innovations concerning the Maltese workforce.

Coordinating functions

The Committee shall liaise with and bring together all parties concerned, mediating the various exigencies and different points of view, with the aim of integrating all forces in a continuous strive for the improvement of human resources, underpinning the economic and social development of the country.

To that end, the Committee shall be composed of the largest representation possible of all bodies and institutions having a responsibility or an interest in the human factor, the only limitation being the cost- effectiveness of the work to be carried out.

Meetings of HRNC

HRNC shall meet on a regular basis and on an ad-hoc basis to deal with specific issues.

As a general rule, the establishment of the calendar of meetings shall be the duty of the Permanent Secretary.

Working groups constituted to tackle a particular issue, should hold meetings until that issue is resolved and specific recommendations are submitted.

Technical studies and related decisions should be delegated to the techno-structure, made up of the Education Innovation Unit of the Ministry of Education and the National Training Agency of the Employment Training Agency.

Annex III

FUNCTIONS OF THE NATIONAL TRAINING AGENCY

1. To establish and run an "observatory on the labour market and on techno-
logical innovation", the aim of which will be the continuous updating of
information on the demand and offer of skilled manpower, both in quantitative
and qualitative terms.

For that purpose it is suggested to exploit, among other sources, the data
bank of the National Council for Vocational Qualifications (NCVQ) of the
United Kingdom and related advisory assistance. This could be very helpful,
provided that the system is not simply copied, but used as a reference and
resources-saving tool.

2. To maintain a continuous dialogue with the industries in order to integrate
technological innovation incidences into manpower development schemes.

3. To establish and run a Research and Development Centre for the innovation
of training methods, techniques, equipment, hardware, software and courseware.

4. To provide consultancy services to industries, particularly small indus-
tries, on issues of human resources training and development, such as job
analysis, training needs assessment, course design, training methods, on-the-
job training programmes and procedures, selection of external training opportu-
nities, manpower planning procedures and formats, job grading, performance
appraisal and potential assessment.

The purpose here is not to substitute for the role that industries must play
in the field of human resources development, but to fill existing gaps and
help in establishing a human resources development culture in industry, thus
bringing it up to a satisfactory level of self-sufficiency.

5. To encourage private initiatives to establish or expand training services
in order to increase the offer.

6. To stimulate, through seminars and direct assistance, the development of
effective human resources management and development practices and tools in
all organizations.

7. To propagate modern methods and techniques for off-the-job and on-the-job
training.

8. To provide training of trainers courses and seminars.

9. To propagate the utilization of modern audiovisual and computer-based
training media.

10. To organize technical training courses and seminars on an ad-hoc basis and
as a stop-gap function. If, for example, several industries need the same type
of course and there is no other reliable source available, or a newly estab-
lished industry cannot yet cope with the training for critical vocations, NTA
(charging for the services) may assign its professional personnel in order to
fill the gap, possibly with the help of external experts.

11. To help industries in establishing an in-service training and human resources development system.

12. To establish and run a Resource Centre, consisting of:

(a) A self-learning centre, which can be used by workers for self-study. The Centre will have books, magazines, training manuals, audiovisuals, computer-based training hardware and software and two or three tutors to guide the users;

(b) A library and audiovisual centre for consultation and lending of teaching/learning material to trainers.

13. To run management training courses that other private and public institutions cannot provide (preferably in cooperation with them). For example, post-secondary or post-graduate basic management courses, also open to already employed personnel. However, the provision of such courses and services should, in the long run, be left as much as possible to the private initiative.

Annex IV

JOB DESCRIPTIONS FOR SUBOPTION 1.A2

The following three job descriptions related to suboption 1.A2 of the proposals (consultancy services: key-resources team), namely for a human resources development expert, an industrial training expert and a job analyst/ researcher, are intended for the selection of candidates and contain a tentative definition of their role and duties within the envisaged National Training Agency (NTA).

Each of the three positions might be filled by one person for the full period of 2 years, or by two or more persons, fielded together or succeeding one another.

While academic qualifications are not of primary importance (a university degree in a relevant discipline is certainly desirable, if not a standard), emphasis should be placed on a wide spectrum of expertise in human resources development and a profound knowledge and relevant experience in the specific area of the experts' envisaged duties.

Moreover, it is assumed that all experts will form a team with the NTA staff.

A. Human resources development expert

Duration: One year, with possibility of extension.

Duty station: Malta, with travel within the country.

Purpose of the assignment: To assist the National Training Agency (NTA) in developing and implementing a programme for the introduction and improvement of cost-effective methods, techniques and tools in the field of human resources development (HRD) in all enterprises and organizations of the country.

Duties: The expert will be attached to NTA and will be expected to:

(a) Select, develop and/or collate a set of general HRD models, policies, procedures and formats, to be offered to companies as reference material, and covering in particular:

- Manpower planning
- Recruitment and selection
- Company familiarization schemes
- Job classification and grading
- Job descriptions and qualification profiles
- Rewarding system
- Succession planning
- Performance appraisal
- Potential assessment
- Off-the-job and on-the-job training methods
- Organized forms of skill and performance upgrading, such as job rotation, job enlargement, job enrichment, assignment, attachment, research and study work, study tours etc.
- Individual career and professional development planning;

(b) Provide advisory services to companies for the introduction of HRD methods, practices and tools;

(c) Prepare and organize seminars and workshops aiming at the propagation of and cross-fertilization in HRD methods, practices and tools;

(d) Train Maltese counterpart personnel, by involving them as much as possible in all programmes.

Qualifications: Human resources development expert with extensive experience in manpower planning, job classification and grading, performance appraisal, potential assessment, individual career and professional development planning and training of personnel.

Experience in computer-based HRD systems an asset.

Language: English.

**Background
information:**
Malta is striving for higher value-added economic enterprises, which usually entail not only high-tech capital- intensive industries but also skill-intensive and well-geared organizational settings.

On government request, a UNIDO team of advisors carried out a survey of training needs and the training delivery system, with the commitment to suggest alternatives for the improvement of technical training for high-tech industries.

The outcome of the survey indicates that, in most of the companies visited, the entire system of personnel management and development (manpower planning, rewarding and motivation, job grading, performance appraisal, career planning, in-service training etc.) does need innovation in terms of methods, techniques and tools.

The newly created NTA, which is part of the Employment Training Agency, under the Ministry of Social Policy, is committed to devise and implement a programme, aimed at instilling among public and private companies a systematic and professional approach to the development of the "human factor" which is increasingly becoming a strategic lever for economic success.

In the area of HRD systems, the programme will comprise three kinds of activities:

(a) **Modelling**: selection, collation and development of easy-to-apply samples of HRD systems, procedures, formats and tools to be offered to the companies as examples to refer to;

(b) **Consultancy**: direct advisory services to companies for the creation or improvement of their HRD system;

(c) **Training**: seminars and workshops to disseminate HRD methods and techniques.

B. Industrial training expert

Duration: One year, with possibility of extension.

Duty station: Malta, with travel within the country.

Purpose of the   To assist the National Training Agency (NTA) in developing
assignment: and introducing systematic and cost-effective in-service
                   training within Maltese enterprises and organizations, and in
                   setting up an external industrial training service, as a stop-
                   gap in instances where in-service training is not practicable.

Duties: The expert will be attached to NTA and will be expected to:

                   (a) Advise on cost-effective methods, techniques, aids and
                        staff competences needed for industrial training;

                   (b) Provide direct advisory services to companies wishing to
                        establish or upgrade in-service training systems and,
                        where requested, help to design training schemes for
                        their personnel;

                   (c) Supervise the design of external industrial training
                        courses to be provided by NTA;

                   (d) Provide advisory assistance to the technical education
                        staff in training methods, particularly in curriculum
                        development methods;

                   (e) Advise on the setting up of a self-learning centre in
                        terms of learning material, documentation and tutoring;

                   (f) Train Maltese counterpart personnel, by involving them
                        as much as possible in all activities.

Qualifications: Industrial training expert with extensive experience in
                   research, development and implementation of industrial
                   training schemes, particularly in:

                   (a) Instructional design or curriculum development methods
                        and techniques;

                   (b) Competence-based methods of training;

                   (c) Vocational qualifications classification and assessment
                        systems;

                   (d) On-the-job training methods, planning, techniques and
                        resources;

                   (e) Methods and procedures for systematic in-company skill
                        upgrading, such as job rotation, job enlargement, job
                        enrichment, assignments, attachment, secondment, research
                        and study work, study tours etc.;

(f)   Organizational structure, policies, methods, aids and
      training skills for in-service training.

Experience in computer-based training an asset.

Language: English.

**Background
information:**   Malta is striving for higher value-added economic enterprises,
which usually entail not only high-tech capital- intensive
industries but also skill-intensive and well-geared organiza-
tional settings.

On government request, a UNIDO team of advisors carried out a
survey of training needs and the training delivery system,
with the commitment to suggest alternatives for the improve-
ment of technical training for high-tech industries.

The outcome of the survey indicates that with a few excep-
tions, industrial training needs new impulses in terms of a
systematic approach and professional staffing. Practices
like training needs assessment and diagnosis, instructional
design, use of different media, training of instructors,
assessment of results etc. should be introduced on a larger
scale. Moreover, the organization, policies, procedures and
competences of staff for a well-functioning in-service
training system should also be a target for improvement.

The newly created NTA, which is part of the Employment
Training Agency, under the Ministry of Social Policy, is
committed to introduce new, or to upgrade existing in-service
training; parallel, an external industrial training system,
public and private, should be created, to serve those
companies where in-service training is not practicable.

To that end, NTA will undertake the following activities:

(a)   Research into and development of industrial training
      methods, aids and techniques;

(b)   Advisory services to companies for establishing or
      upgrading in-service training systems and for designing
      training programmes;

(c)   Design and implementation of external industrial training
      courses, where and when necessary;

(d)   Conduct training of trainers courses and seminars at a
      later stage;

(e)   Set up a resource centre for self-learning for workers
      and instructors.

C. Job analyst/researcher

Duration: One year, with possibility of extension.

Duty station: Malta, with travel within the country.

Purpose of the assignment: To assist the National Training Agency (NTA) in setting-up a permanent "observatory on the labour market and on technological innovation" and to adapt the NVQ experience to the Maltese environment.

Duties: The expert will be attached to NTA and will be expected too:

(a) Assist NTA in setting up a permanent observatory on the labour market and on technological innovation with a view to defining and forecasting skill requirements;

(b) Develop a dynamic system of vocational qualifications, adapted to the Maltese situation and borrowing from the United Kingdom experience with the new National Vocational Qualifications (NVQ) system;

(c) Provide advisory services to companies on methods, techniques and tools for job analysis, training needs analysis and diagnosis;

(d) Train Maltese counterpart personnel, by involving them as much as possible in all activities.

Qualifications: Profound theoretical knowledge of and extensive experience in vocational and industrial training needs analysis. Familiarity and field experience with the National Vocational Qualifications (NVQ) system of the United Kingdom as a basis and main reference for the expert's work.

Expertise in the following areas is of particular relevance:

- Competence-based vocational and industrial training methods

- Training needs analysis and diagnosis techniques and tools

- Classification and assessment of vocational qualifications, with special reference to the NVQ guidelines set by the National Council for Vocational Qualifications (NCVQ) in the United Kingdom

- Labour market research methods, techniques and tools

- Latest technologies having a substantial impact on the skills of the workforce

Experience in computerized data gathering and processing an asset.

Background information: Malta is striving for higher value-added economic enterprises, which usually entail not only high-tech capital- intensive industries but also skill-intensive and well-geared organizational settings.

On government request, a UNIDO team of advisors carried out a survey of training needs and the training delivery system, with the commitment to suggest alternatives for the improvement of technical training for high-tech industries.

The outcome of the survey indicates that there is a strong need to reshape the vocational training system to become more cost-effective and to produce up-to-date qualifications, in line with the demand on the labour market and, also, to innovate the in-service training system, which is dependent on sound methods and practices of job analysis and training needs analysis and diagnosis.

The newly created NTA, which is part of the Employment Training Agency, under the Ministry of Social Policy, is committed to reorient vocational and industrial training towards the real and pressing needs of employement, individuals and the economy as a whole. For that purpose, NTA will establish, as a priority, an effective system for the continuous analysis and diagnosis of training needs, starting with specifications of specific skill profiles as a basis for organized training.

Annex V

INDUSTRIAL TRAINING METHODOLOGY GUIDELINES

A. The differences between education and training

At the extreme ends of the spectrum under consideration are academic education and industrial training. Technical training and vocational training lie somewhere in the middle of the continuum.

Since the concept of school or academic education is fairly well known, the concept of industrial training shall be reviewed in detail in the following.

The aim of industrial training is to equip workers or potential workers with the competences (skills, attitudes, knowledge) required to properly perform the roles and duties entrusted to them by an organization. In other words, industrial training is an investment in human resources in order to qualify them for job performance according to expectations of employment or professional bodies.

Industrial training basically differs from school education in that both the specific requestor and the addressee are different. In the case of industrial training, training is requested by the management or the potential employer, and the addressees are workers or people seeking a job; in the case of education, it is the society at large and the citizens in general.

This entails a series of differences between the two concepts, which may be summarized as follows.

Different aims

Training is an investment in human resources to meet defined organizational goals and operational objectives. Those who decide on the implementation of training programmes are managers, whose main interest is to solve very specific operational problems.

On the other hand, educational programmes are decided by representatives of the society, possibly within the ministry of education, their main aim being the development of the individual to meet the human and cultural requirements of the society.

Different economic criteria

The educational system does not have to respect strict economic criteria; time and resources are allocated with loose reference to what is to be produced.

Industrial training, instead, is a tool for improving the productive value of human resources, and in the allocation of time and resources the same economic criteria are applied as in the production of goods or the delivery of services. The rule is to get the maximum yield in the shortest period of time.

Effectiveness is a must in industrial training

The logics of economics and productivity of work organizations demand clearly defined and tangible results from industrial training. This entails – much more than in the educational system – a precise definition of the objectives and a systematic design of training events, as well as a critical assessment of results.

Industrial training is engineered upon operational skills and attitudes, while in education the acquisition of knowledge is the overwhelming aim

Industrial training programmes basically aim at job-related competences in a pragmatic way, while educational programmes principally aim at promoting knowledge.

Moreover, the knowledge to be transferred in industrial training is only one which is functional to the acquisitions of operative skills and attitudes, including job-related cognitive skills.

As regards the relative importance given to the acquisition of skills and attitudes on one side and of knowledge on the other, figure I may better than words illustrate the different concepts.

Figure I. Relative importance given to the acquisition of skills, attitudes and knowledge in industrial training and in education
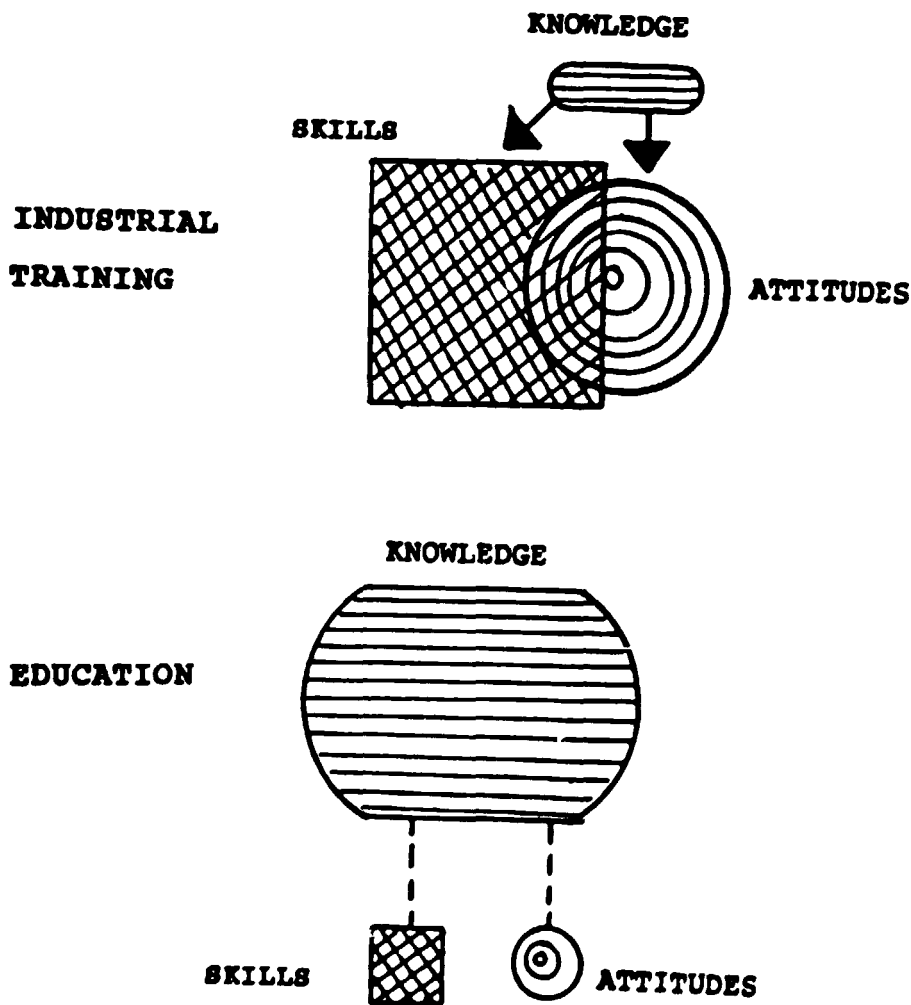
Training presupposes the student's success

The educational system usually discriminates and selects amongst students. The basic criterion is to promote good students and fail or keep back poor performers. Proficiency and failure are both accepted as normal in this context.

Industrial training does not, as a rule, accept failure. All trainees, apart from exceptional cases, are to be guided to success, that is, they must acquire the competences for which they are being trained.

The performance or profit scales are not based on the group's average (group reference system), as normally done in education, but on objectives set in advance (criterion reference system). In other words, in industrial training, the trainees must all be brought to the acquisition of the foreseen specific competences required. If this does not occur and there is a mismatch between objectives and results, it is not the trainee's fault, but rather that of the trainer or the system.

This is also reflected in the scoring systems. In education, a 50-60 per cent average mark is considered normal, but in industrial training the trainees performance should approach 100 per cent.

At this point, a key-question emerges: have the methods for education and industrial training to be different? In theory, there need not be any difference, at least not a significant one. Methods, techniques and instruments can, to a great extent, be very similar, if not actually the same.

But in reality, industrial training practices are different. In industrial training, there is a kind of "engineering" approach, meaning a careful channelling to ensure specific results; it is more practice-oriented and, in general, more productive in terms of tangible learning outcomes.

Criteria such as efficiency, effectiveness, productivity and control which are characteristic of the industrial world, have entered the industrial training process to the point that sometimes the term "training technology", with all its flavour of an advanced and cost-effective way of production, is preferred to the term "training methodology", irrespective of whether or not the delivery of training is coupled with the use of sophisticated media, such as computers and audiovisuals.

Further, there are certain specific features of the world of work that generate opportunities or constraints and restrictions that the educational system does not have. Hands-on practice, direct application of competences, real life simulation, tangible results to be attained, job orientation of the investment in training, adult population as trainees etc. are just examples of the differences between training and education and of the possible functions of the related delivery system.

B. Industrial training as a production system

The notion of "training technology" evidences the magnitude of changes that have taken place and continue to happen in training in general. The training process has, in fact, been integrated into technological development and features the same criteria of efficiency, effectiveness, productivity and control that are typical of industrial production. A training system could be

termed a "learning factory" for the production of skills and competences of workers.

Figure II illustrates the transformation process which takes place in a training system.

The input to the "cycle" are the competences already possessed by the trainees upon entry (knowledge, skills, attitudes, values, experience and motivation). The output is twofold: as immediate results, we have learning outcomes (new or improved competences, skills, knowledge etc.); as final results, we have improved standards of job performance.

This "transformation" takes place through a training structure that includes:

(a) Human resources: management, training staff, instructors etc.;

(b) An organizational structure: organization chart, policies, procedures, information system, methodology;

(c) Facilities: buildings, laboratories, classrooms and services;

(d) Material resources: financing, equipment, audiovisual and teaching aids;

and through training operations which are distinguished into:

(a) Engineering activities: needs analysis. long-term plans, programmes, course design, methods research and development, production of training material, evaluation devices etc.;

(b) Training implementation operations, such as courses, seminars, exercises, on-the-job training, guided experience etc.

The control of the immediate learning outcomes together with that of the final results (job performance) provides, thanks to feedback through suitable assessment measures, the self-regulation of the system.

C. The systems approach

The systems approach was first applied in the 1950s, in advanced engineering, in order to deal with extremely complex design and development problems, especially in the electronic and space industries. It then became a widely adopted model in high-tech projects and advanced technology industries.

In industry, the systems approach may be concisely described as a "cybernetic loop" that entails: the identification of requirements, the setting of precise production goals, the systematic design and planning of process and resources, the efficient implementation of production, and the quality and quantity control of results, which gives a feedback and permits to critically review the full system from the first phase onwards (closing the loop) so as to validate or correct the process itself.

In summary:

. Problem analysis
. Production goals

Figure II. Training as a production system

INPUT :	TRANSFORMATION		OUTPUT	
	TRAINING STRUCTURE	**OPERATIONS**	**IMMEDIATE RESULT**	**FINAL RESULT**
COMPETENCIES ALREADY POSSESSED BY THE TRAINEES ON ENTRY: • KNOWLEDGE • SKILLS • ATTITUDES • VALUES • EXPERIENCE • MOTIVATION	**HUMAN RESOURCES** – MANAGEMENT – TRAINING STAFF – INSTRUCTORS – SUPP. SERVICES **ORGAN. STRUCTURE** – ORGAN. CHART – POLICIES – PROCEDURES – INFORM. SYSTEM – METHODOLOGY **FACILITIES** – BUILDINGS – LABORATORIES – CLASSROOMS – SERVICES **MATER. RESOURCES** – FINANCING – EQUIPMENT – A/V AIDS – TEACHING AIDS	**ENGINEERING** – NEEDS ANALYSIS – LONG TERM PLANS – PROGRAMS – COURSE DESIGN – METHODS RESEARCH AND DEVELOPMENT – PRODUCTION OF TRAINING MATERIAL – EVALUAT. DEVICES – ETC. **IMPLEMENTATION** – COURSES – EXERCISES – ON THE JOB TRAINING – GUIDED EXPERIENCE – ETC.	**LEARNING OUTCOMES** NEW OR IMPROVED COMPETENCIES: • KNOWLEDGE • SKILLS • ATTITUDES • VALUES • EXPERIENCE	**JOB PERFORMANCE** ACCEPTABLE STANDARD OF JOB PERFORMANCE BY PERSONNEL TRAINED (IN RELATION TO ABILITIES ACQUIRED)

FEED–BACK

- 44 -

- Design and planning
- Implementation
- Control of results
- Corrective feedback.

The matrix of this method is not new. Its origins can be traced back to the research method of experimental science, notably to Galileo's inductive-experimental model, which comprises:

- Analysis of phenomena
- Generalization of experience and formulation of a hypothesis
- Verification of the hypothesis
- Confutation of said hypothesis, or validation of the same and subsequent formulation of a law or a formal generalization.

The basic elements of the systems approach applied to instructional design may be outlined as follows:

- Needs analysis
- Training design
- Development
- Implementation
- Control (evaluation).

Needs analysis implies an analysis of training needs within a given work organization. The needs analysis serves to identify the target population and the kind and level of skills, attitudes and knowledge they really need for proper performance at their workplace.

This leads to training design, which basically consists of conceiving, defining and planning the training itinerary (what kind of training), learning objectives, sequencing and scheduling of instruction, theoretical and practical contents to be included, instructional methods and techniques to be adopted, kind of courseware to produce or to acquire, equipment and hardware required, teaching and other staff resources to use, logistic arrangements, necessary budget etc.

In the development phase, hardware and courseware specifications are developed, written and audiovisual teaching material bought or developed, human and material resources assured and the logistic organization set up.

The implementation involves preparing the training facilities, setting the schedule, providing guidelines for the trainers, checking the entry level of trainees and, obviously, holding the courses.

Evaluation permits to assess the trainee's learning performance together with the teaching performance and to verify the effectiveness of the training programmes. The control of these results is a precious feedback for the validation or the correction of the training programme and of the whole training system.

Figure III illustrates the "procedure". However, as will be stressed later, instructional design does not actually follow such a linear or step-by-step approach.

ANALYSIS

INPUT	OPERATIONS	OUTPUT

- DIRECTIVES OF MANAGEMENT
- HIERARCHY REQUEST
- REQUEST OF WORKERS AND/OR UNIONS
- PLANS OF PERSONNEL DEVELOPMENT
- PLANS FOR RECRUITMENT, JOB ROTATION,
  JOB ENLARGEMENT, JOB ENRICHMENT,
  REORGANISATION ETC
- LONG TERM TRAINING PLAN
- REGIONAL OR SECTOR PLAN
  FOR THE PROFESSIONAL
  QUALIFICATION OF YOUTHS.

— . . . .

- NUMBER AND JOB POSITIONS OF PERSONS
  TO BE TRAINED
- IDENTIFICATION OF ACTIONS TO UNDERTAKE
- GOALS OF THE ORGANIZATION
- FINAL PROFILE OF PEOPLE TO BE TRAINED
  (SKILLS REQUIRED)
- ENTRY PROFILE (SKILLS ALREADY POSSESSED)

— . . . .

- DECODIFICATION/INTERPRETATION OF REQUESTS
- CONTEXT ANALYSIS
- CRITICAL EVENT ANALYSIS
- ANALYSIS OF POPULATION TO BE TRAINED
- ANALYSIS OF ROLES AND TASKS
- DIAGNOSIS OF NEEDS IN TERMS OF REQUIRED SKILLS
- SELECTION OF COMPETENCIES TO BE TAUGHT
- HYPOTHESIS OF TRAINING MEASURES TO UNDERTAKE
- STUDY OF PRIORITIES, CONSTRAINTS, ORDER AS
  WELL AS THE RESOURCES AND MEANS AVAILABLE.

— . . . .

Figure III (continued)

DESIGN

INPUT	OPERATIONS	OUTPUT

PROGRAM

- TYPE AND NUMBER OF TRAINING ACTIONS
- PROGRAMS (CONTENTS)
- OBJECTIVES

OUTPUT OF ANALYSIS PHASE

- METHODS
- MEANS
- TEACHING AIDS (TEXTS, EXERCISES ETC.) TO USE

....

REALIZATION PLAN

- TIME DISTRIBUTION
- EMPLOYMENT OF HUMAN RESOURCES
- TRAINING MATERIALL PRODUCTION PLAN
- LOGISTIC PLAN
- BUDGET
- .....

- PLANNING OF LEARNING PATH
- DEFINITION OF SPECIFIC TRAINING ACTIONS
  (COURSE, MODULES, TRAINING UNITS, SEMINARS,
  ON THE JOB TRAINING)
- DEFINITION OF PROGRAM, SEQUENCES AND CONTENTS
  (SYNTHETIC)
- DEFINITION OF LEARNING OBJECTIVES
- DEFINITION OF TESTING PROCEDURES
- DEFINITION OF MEASURES FOR ASSESSING TRAINING
  RESULTS
- DEFINITION OF REQUIRED HUMAN RESOURCES
- DEFINITION OF TEACHING MATERIAL TO
  PREPARE/ACQUIRE
- DEFINITION OF METHODS
- DEFINITION OF FEASIBILITY AND ALTERNATIVE
  CHOICES
- PROJECT NEGOTIATION
- ....

Figure III (continued)

DEVELOPMENT

INPUT	OPERATIONS	OUTPUT

PRINTED MATERIAL

OUTPUT ..OF DESIGN PHASE

- TEXTS, MANUALS
- TEACHING GUIDES
- EXERCISES
- PRACTICAL WORK GUIDES
- DETAILED PROGRAM FOR ON THE JOB TRAINING
  (IF FORESEEN)
- WORK SHEETS
- ......

AUDIOVISUAL SOFTWARE

- TRANSPARENCIES
- FILMS
- SLIDES
- COMPUTER PROGRAMS
- ......

LOGISTIC PLAN

- MEALS, TRANSPORTATION, BREAKS, TIMETABLE, ETC.

RESOURCE EMPLOYMENT PLAN

INFORMATION SHEET

....

- DESIGNING AND WRITING (OR ACQUISITION) OF TEXTS,
  MANUALS, GUIDES, EXERCISES, WORK SHEETS.
- PRODUCTION (OR ACQUISITION) OF AUDIOVISUAL SOFTWARE
  AND IF NECESSARY COMPUTER SOFTWARE
- DESIGN AND PLAN OF INSTRUCTIONAL UNITS
  (MICRO-DESIGN)
- LOGISTIC PLANNING
- PROGRAM OF USE OF EQUIPMENT AND OTHER MEANS
- ....

Figure III (continued)

IMPLEMENTATION

INPUT	OPERATIONS	OUTPUT

- TEACHERS
- STUDENTS
- PROGRAMS
- TRAINING MATERIAL
- TRAINING FACILITIES,
  EQUIPMENT
  MEANS
- DEVELOPMENT MODALITIES
- ....

- WORKERS WITH ENVISAGED COMPETENCIES

  . KNOWLEDGE
  . SKILLS
  . ATTITUDES

- LEARNING EVALUATION DOCUMENTS

- TRAINING CYCLE
- COURSE MODULES
- TRAINING UNITS
- SEMINARS
- ON THE JOB TRAINING
- EXTERNAL COURSES
- SELF TRAINING
- SIMULATION
- .....
- .....
- ASSESSMENT OF LEARNING RESULTS

Figure III (continued)

CONTROL

INPUT	OPERATIONS	OUTPUT
- RESULTS OF LEARNING, PERFORMANCE (TESTS, EXAMS, PERFORMANCE EVALUATIONS) - RESULTS OF PERFORMANCE ON WORK SITE (EVALUATION GRIDS, INTERVIEWS, PERFORMANCE EVALUATION SHEETS, ETC) - DATA ON THE EFFECTS OF TRAINING ON ORGANIZATION - FEED-BACK	- EFFECTIVENESS CONTROL AT LEARNING LEVEL - COST/BENEFITS ANALYSIS FOR THE ORGANIZATION - ANALYSIS OF THE EFFECTIVENESS OF ALL PARTS OF THE TRAINING SYSTEM -	- VALIDATION OR REVISION/IMPROVEMENT OF TRAINING PROCEDURES, PROGRAMS, METHODS, ETC. - VALIDATION OR REVISION/SUBSTITUTION OF TEACHING AIDS - VALIDATION OR MODIFICATION OF PARTS OF TRAINING SYSTEM - REMEDIAL TRAINING PROGRAMS - TRAINING PROGRAMS FOR TRAINERS - . . . .

The systems approach to instructional design lends itself quite well to flow chart presentation. In fact a variety of different perspectives and practices of basically the same method are presented in the form of graphs in technical literature. They all fall between two poles: the linear or step-by-step and the cyclic or interactive model. Figures IV and V are examples of the two patterns.

In figure V the training phases are interdependent. The diagram also shows that control is considered a continuous process, consisting of an internal control (within the training system, the prominent part of it being learning assessment) and an external control (from the organization's perspective, i.e. assessment of job performance, evaluation of benefits etc.).

Graphs, no matter how complex, cannot fully reflect the characteristics and the great potentiality of the systems approach in instructional design.

Indeed, Romiszowski (1981) highlights very well the limitations of such diagrams, especially those of flow charts:

"However, such flow chart presentations are an ineffective, indeed a somewhat misleading, way of explaining the systems approach:

"1. They give the impression of a more or less linear, step-by-step process, where one step is completed before the next one is commenced. This is not in fact the case. Problem-solving involves a lot of jumping forward, based on sudden insights, and feeding back to complete or alter earlier steps. The flow charts should have arrows (perhaps dotted to indicate the occasional use of these paths) from every block to every other block, both forwards and backwards. But this would make the diagrams so cluttered as to be unreadable.

"2. They give the impression that most of the analysis happens at the beginning, the synthesis or design stages about the middle and evaluation mainly at the end of the process. In reality, systems thinking (the application of the systems approach) involves the exercise of these three types of intellectual activity at all stages throughout the process.

"3. Finally, such flow charts have tended to give the impression that the procedure is mechanistic, that there are precise rules for the carrying out of each stage, as in the case of a flow chart of a computer procedure. Some rules do exist but these do not cover all eventualities. Some step-by-step procedures exist but these are more to guide one's thinking rather than to take over the thinking process. The systems approach to problem-solving is not algorithmic; it is heuristic. (These terms are used here in the sense in which they are used in mathematics.)"

Romiszowski's statement that the systems approach to problem-solving is heuristic rather than algorithmic is illuminating.

An algorithm is the key to a solution, that is to say a procedure which, if suitably followed, certainly leads to the solution of the problem; an heuristic process is rather a searching strategy than the application of

Figure IV. Linear or step-by-step conception of
instructional design

ANALYSIS

OBJECTIVES

DESIGN AND
IMPLEMENTATION

TRAINEE
EVALUATION

REVISION OF
PROGRAM

```
                    ┌─────────────────────────────────────────┐
                    │ JOB ANALYSIS          NEEDS ANALYSIS     │
                    └─────────────────────────────────────────┘
                    │ SELECTION OF TASKS TO INCLUDE IN THE     │
                    │ TRAINING PROGRAM                         │
                    └─────────────────────────────────────────┘
                        │ ANALYSIS OF TASKS │
                    │ FORMULATION OF LEARNING OBJECTIVES       │
                    │ (FINAL AND SUPPORTS OBJ.DERIVED FROM TASKS) │
                        │ OBJECTIVE SEQUENCING │
                    │ CONTENTS SEQUENCING METHOD SELECTION     │
                    │ PREPARATION OF        SELECTION OR       │
                    │ REALIZATION PLAN      PRODUCTION OF AIDS  │
                        │ PROGRAM IMPLEMENTATION │
                    │ TRAINEE PERFORMANCE                      │
                    │ EVALUATION                               │
                                        │ PROGRAM EFFECTIVENESS │
                                        │ EVALUATION            │
```
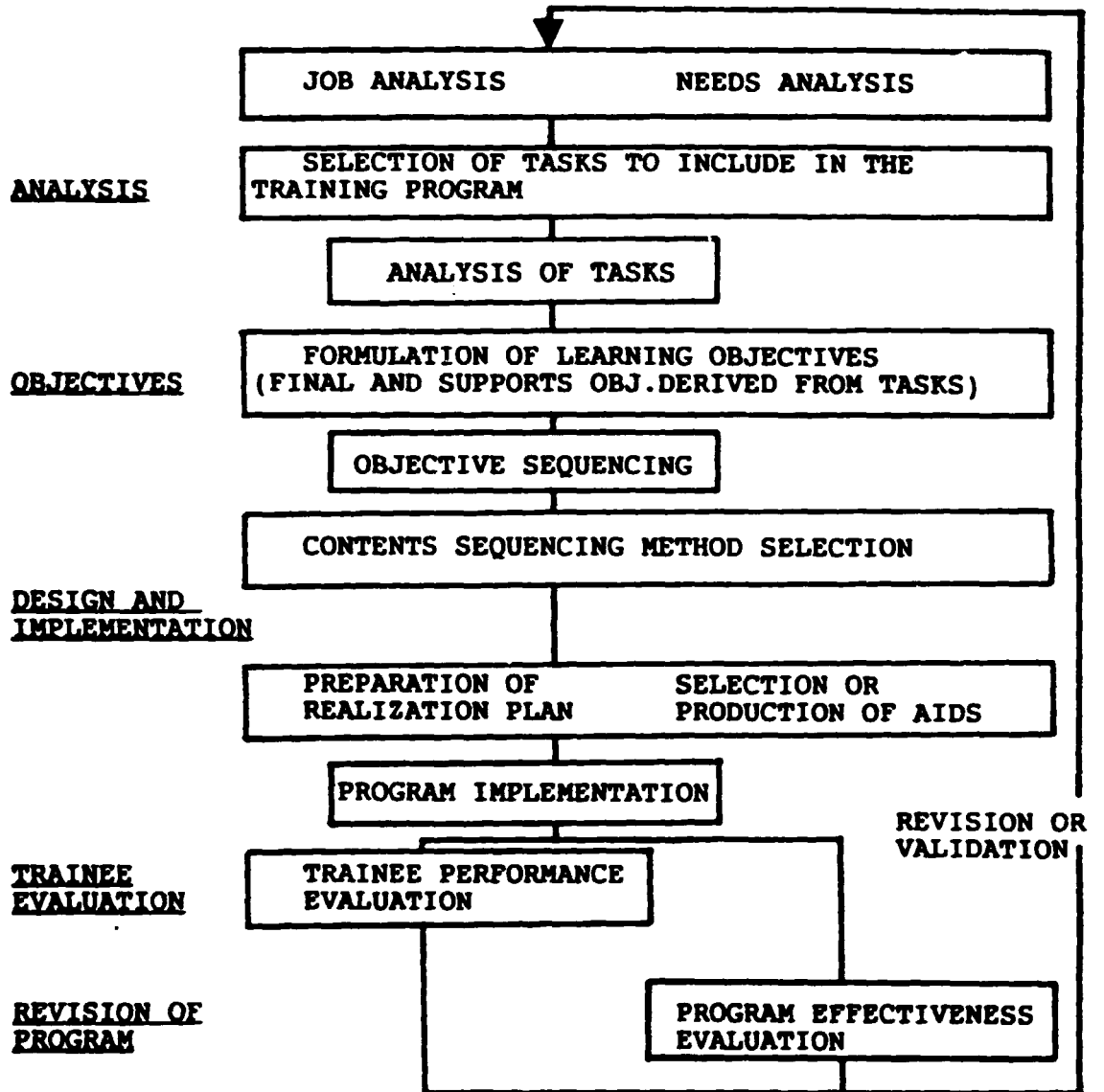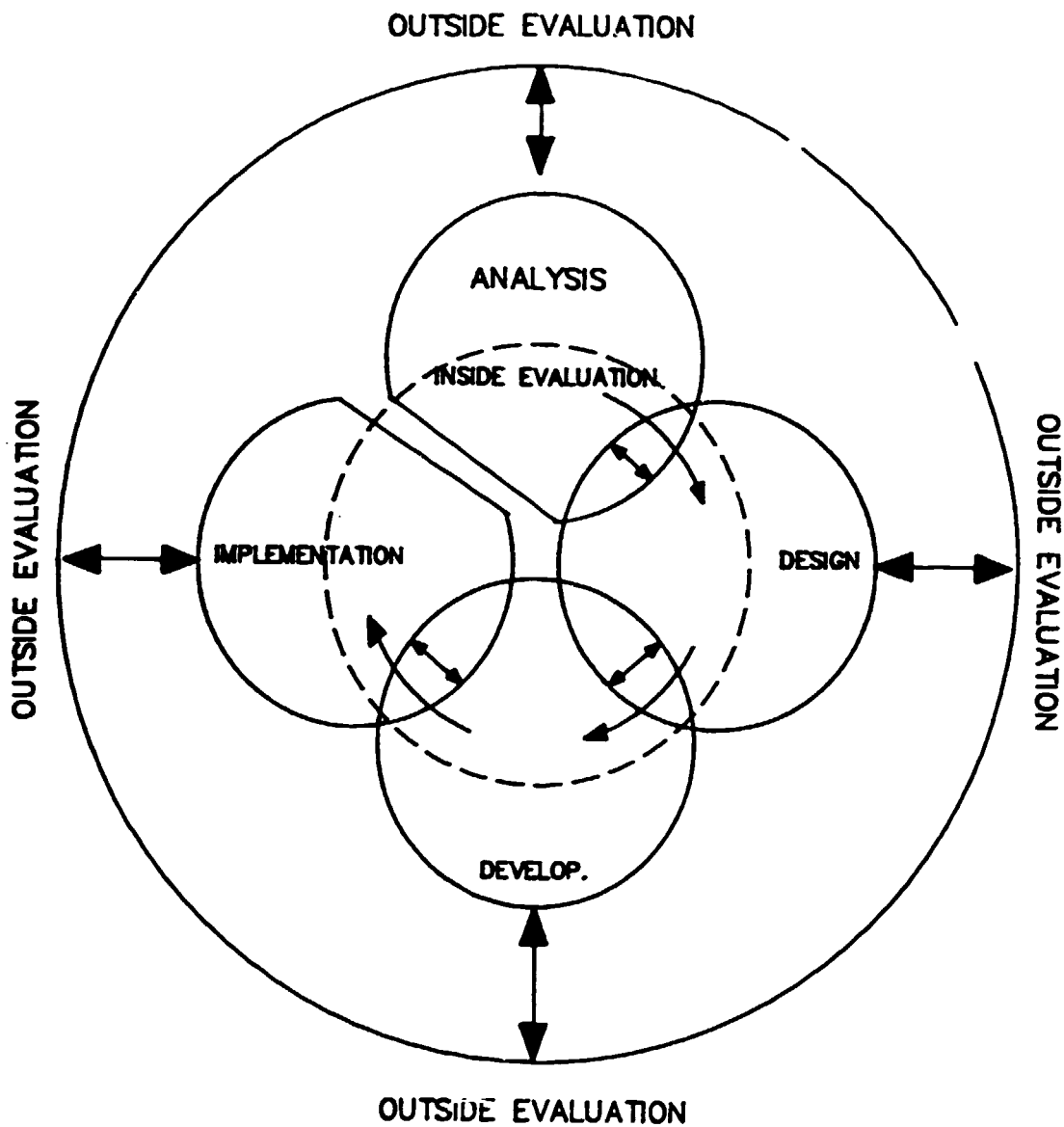
REVISION OR
VALIDATION

Figure V. Cyclic or interactive conception of instructional design

precise rules. This highlights the creative dimension of the systems approach and counterbalances the idea that procedures and defined techniques and formulae are to be mechanically applied in the process of instructional designing.

A corollary and an essential precondition in the application of the systems approach to training, is the integration of the training system with the client's system, which usually is a definite work organization. A correct approach imposes that courses be geared towards the competences needed by and within the client's organization.

The importance of training needs analysis and the evaluation of training results are consequently of vital importance in training methodology; these elements link training with the work organization, i.e. with its "raison d'être".

Industrial training methodology thus emerges from its "pedagogical" shell and merges with organizational theories and practices, the bridge being human resources management and development methods and techniques: manpower planning, job analysis, selection of personnel, career plans, performance appraisal, potential assessment etc.

Good training is, in fact, an integral part of human resources management and development practices in a given work environment.

Annex VI

TRAINING OF TRAINERS: A REFERENCE GUIDE

This short guide for the training of trainers refers to industrial training; however, the courses can easily be adapted for technical and vocational training staff.

First, some guidelines for the design of the programme are given, then an outline of a modular programme is presented, followed by a matrix showing how these modules can be composed to form training courses for at least three different professional profiles of trainers:

- Training managers or coordinators
- Instructional designers
- Instructors.

Obviously, the time allocated to a module or the depth in which a subject is treated will vary.

Programme guidelines

The courses should cover two major aspects: the institutional function of training and the role of the trainer.

The institutional function of training

The institutional function of training (industrial and vocational) basically means the integration of training into the work organization's framework (be it a single company or an employment sector). Training must be dealt with as an integral part of work organizations' aims and plans, i.e. as a tool for the qualification and development of human resources. It must therefore be job- or employment-oriented and competence-based.

This implies that the trainer's body of knowledge has to overlap with competences called for in human resources management and development, as well as with those needed for the management of an organization, including an understanding of all external variables affecting quality and availability of the "human factor" in the world of work (labour market developments, technology innovations etc.).

The specific competences of a training specialist

Here, the focus is on the specific competences required to carry out a training activity, including design and planning of instruction, pedagogical aspects and training activity administration.

The envisaged programme must give priority to instructional competences, which for instructors, but also for instructional designers, should include the following:
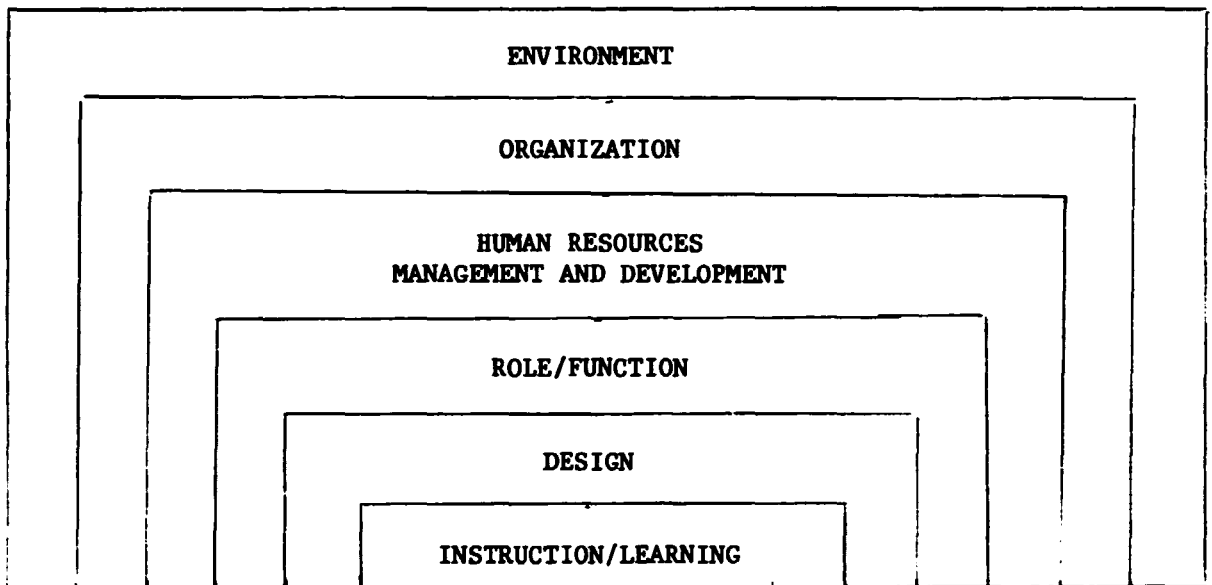
- How to design an instructional unit
- How to draw up a lesson plan
- How to state learning objectives
- How to construct learning assessment instruments

- Ho. to make an effective classroom presentation
- How to communicate effectively
- How to motivate adult learners
- How to prepare transparencies.

For instructional designers and, to a lesser extent, for training managers, the main objective is to enable them to "engineer" a training project covering the phases of:

- Training needs analysis
- Course design
- Assessment of training results.

From this core of instructional competences, those related to the role and functions of trainers, to human resources management and development practices, to the organization, and finally to the external environment have to be built up, as shown in the following graph.

```
+-------------------------------------------------------------------------+
|                              ENVIRONMENT                                |
|   +-----------------------------------------------------------------+   |
|   |                          ORGANIZATION                           |   |
|   |   +---------------------------------------------------------+   |   |
|   |   |                    HUMAN RESOURCES                      |   |   |
|   |   |               MANAGEMENT AND DEVELOPMENT                |   |   |
|   |   |   +-------------------------------------------------+   |   |   |
|   |   |   |                  ROLE/FUNCTION                  |   |   |   |
|   |   |   |   +-----------------------------------------+   |   |   |   |
|   |   |   |   |                  DESIGN                 |   |   |   |   |
|   |   |   |   |   +---------------------------------+   |   |   |   |   |
|   |   |   |   |   |      INSTRUCTION/LEARNING       |   |   |   |   |   |
|   |   |   |   |   +---------------------------------+   |   |   |   |   |
|   |   |   |   +-----------------------------------------+   |   |   |   |
|   |   |   +-------------------------------------------------+   |   |   |
|   |   +---------------------------------------------------------+   |   |
|   +-----------------------------------------------------------------+   |
+-------------------------------------------------------------------------+
```

For instructors' training the importance of the topics decreases from the core outwards, while for training managers it increases. Instructional designers cover the largest span.

Of paramount importance are attitudes which, without distinguishing between the three roles, may be summarized as follows:

- Systematic and methodical approach in providing training

- Target any training action to learning and/or performance results, defined in advance in terms of concrete and verifiable objectives

- Systematically check whether the envisaged training results have been attained

- Always assure coherence between objectives, contents, evaluation techniques, entry-level assessment tests and instructional methods of a training programme

- Target all training efforts on the learner and on learning outcomes as the immediate result of instruction

- Orientation of the training job/service to the "logics" of the enterprise for which training is given. This means to be conscious that training of personnel is a subsystem of human resources management, itself being a subsystem of organization management. It also implies the consciousness that training needs stem from organization or employment exigencies and training results must finally be measured in terms of job performance.

- Positive approach to teamwork

- Open-minded for an "engineering" approach to training which, at the same time, has to be methodical and creative, procedural and flexible, depending on the situation and the goals to be pursued. Such an attitude requires the mastery of methods and techniques, combined with enough flexibility and pragmatism to choose, change or re-invent them according to constraints, opportunities, resources and other changing variables

- Value human resources as really important, very often strategic, for the achievement of social as well as economic goals

- Believe in the trainees' potential, especially as it concerns their becoming responsible for their own learning process

- Pay attention to the transfer of learning to the work setting.

Cognitive objectives, which should be subordinated to attitudinal and to operative (practical skills) objectives, cover knowledge-related to topics such as:

- Learning theories
- Adult education
- Taxonomies of objectives
- Organization structures
- Job descriptions
- Performance appraisal
- Group dynamics
- Communication theories
- Motivation

Programme outline

Module	Subject

1   Industrial training features; roles and competences of trainers

2   Instruction and learning

        Theories, methods and techniques with special emphasis on adult education

3   Work organization, management of human resources and training

        With field experience in job analysis (designers)

4   Training systems and the training process

5   Training needs analyses

6   Course design

        With simulation of projects (designers)

7   Learning assessment and evaluation of training results

8   Training equipment and hardware

9   Courseware: printed, audiovisual and computer-based

10   Introduction to computer-based training

11   Design and planning of instructional units

        With actual design and planning of micro-lessons and exercises (instructors and designers)

12   Teaching delivery techniques

        With micro-teaching exercises

13   Group dynamics

14   On-the-job training methods

15   Administration of training activities

16   Management of training centres

17   Study tours and field work