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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

Industrial Human Resources Development Branch

Department of Industrial Operations

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

FINAL REPORT PREPARED FOR THE MALTA GOVERNMENT

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INDEX

1. BACKGROUND

The Maltese Government is experiencing a serious shortage of qualified manpower in 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 the only one.

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

On the above premises, and following consultations between Malta's political and industrial personalities and UNIDO's representatives, the Maltese Goverment requested UNIDO to provide assistance, with the elaboration of a programme designed to provide a strategic technical skill-training capability to service the Maltese industry.

A project has therefore been devised to provide "High Level Assistance to Identify Alternative Strategies for Technical Training in Electronic Industries".
(The initial focus on Electronic Industries has, in fact, widened during implementation to all high-tech industries as deserving the same attention in terms of human resources.)

The objectives of the project were:

1. **TRAINING NEEDS:** To assess present and projected high-skill demand as regards the electronic industry, both urgent and long-term.

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

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:

- Survey in Malta (Analysis).
- Study of Outcomes (Assessment).
- Interim Report (Findings and Suggestions).
- Discussion in Vienna with Maltese Government representatives.
- Final Report.

IMPLEMENTATION

On the basis of a project document prepared by the Industrial HRD Branch of the Department of Industrial Operations of UNIDO, two consultants were fielded with the assignment of carrying out the study of the situation and preparing an advisory report.

The consultants, assisted by Malta Development Corporation personnel, conducted a two weeks' survey in Malta, starting on April 2, 1990.

The investigation approach was based on the following sources of information:

a) Relevant documentation.

b) Two Questionnaries, one administered to Electronic and Supporting Industries and the other to Technical Istitutes.

c) A number of interviews, around 20, conducted with the help of predefined interview guides and aimed at collecting information from key-persons in the electronic and supporting industries, in the educational and training istitutions and in public institutions and associations concerned.

d) A few meetings and interviews, towards the end of the survey period, with selected knowledgeable people in order to exchange ideas and test relevant information.

More details on the methodology of the survey and the list of respondents to interviews are in the appendices.

Some problems were encountered with the questionnaires (mail delays, short times and lack of personnel for reaching all respondents to whom questionnaires were sent) but all in all, the questionaires returned are a significant sample for the information sought, especially in relation to the training delivery system.

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

All in all, the mission has allowed the consultants to define the terms of the problem as a basis for the suggestion of solutions.

The two consultants have also visited various industries

and training institutions in Italy and in the United Kingdom in order to enrich the basis of comparison with advanced paradigma of emerging skills and training solutions.(see Annex B)

An Interim Report has been the basis of a fruitful discussion between Unido's officers and consultants and the Malta delegation at a four days' meeting held in Vienna in the fourth week of May 1990.

The meeting proved to be very useful for tuning and ensuring relevance to the report as well as for sketching the outline of an action plan for the follow up.

2. FINDINGS OF THE MISSION TO MALTA

Foreword

Herebelow are listed a number of problems and disfunctions that resulted from the findings of the mission to Malta. The impression that arises may eventually damage a balanced vision of the situation. It is therefore opportune to immediately state that the global impression of the two consultants during their "intense" visit to Malta is generally positive.

The social context in Malta - both economic and social - is dynamic and open to innovation. The local industry features certain aspects of advanced technology, high quality and good solutions. Many good ideas are to be found, may be even too many, and a clear understanding of problems - even though this might be fragmentary. Fundamentally, there is a widespread desire to improve and the potentiality to obtain good results.

As to human resources, the situation is not so "dramatic" as it might appear, considering only shortcomings and weaknesses. Certainly, much is to be done, and immediately in order to face the challenge of ongoing and future development, but the Maltese workforce may already be considered a good asset. Furthermore, there is a good degree of adaptability and good potentiality for improvement.

The Maltese are right when they feel that they can "dare" and afford more within the framework of the international market.

Findings:

1. **Human Resources : more an emergency of "method" for producing the right ones, rather than numbers and specific specialisations.**

   From survey findings, it emerges that, as regards electronic and high-tech industries, there is not, at present , what could be called an "emergency" situation in terms of skilled manpower shortfalls and technical skills shortages. There is certainly a need, especially of high-skilled technicians, but the real emergency, if any, is in relation to future needs since new high-tech industries are incoming or the present ones move to higher automation and advanced technologies.

   In such perspective, the problem - the emergency - appears not only to be "in getting fishes" -(skilled personnel) - but principally in the "fishing techniques" - the methods of producing the right skills for the right needs at the right time.

   In other words, there is a crucial need to improve and innovate the overall skill production " machinery": education and training, including the capability to analyse and define what skills are needed in the short and long run by the labour market (the latter point should be the guiding compass of the training delivery system).

   The aforementioned does not, however, imply that everything concerning skilled manpower must be produced locally. A need to apply to overseas training and exposure will always exist. However,one thing is a blind dependency and completely another one is the competent choice of what is needed and could be found and where abroad. This also requires qualified competence.

2. **Industrial training in Malta is practically absent.**

N.B. The term industrial training is used here in a wider sense, meaning training for newcomers or for already working personnel from any organisation, be it industrial, commercial, service or even public administration. Distinction is to be made instead in respect of education and particularly technical education and school-based vocational training.

a) Malta's based industries do not have, but for a few exceptions, established training systems/ services/sections/centres.

b) Even where some forms of off-the-job training are provided, this training is not "engineered" on a professional basis. In other words, practices such as: job analysis, training needs analysis and diagnosis, course design, instructional unit design and plan, courseware preparation, audiovisual media utilisation, results evaluation and so on, are very rarely in use.

c) Also the on-the-job training, where provided, is not, in general practice, systematically planned, programmed and monitored.

d) Some companies send their personnel abroad for training, but obviously as an extreme remedy, and on a very limited scale.

e) Other forms of in-service practices of skill, attitudes and knowledge improvement, such as job-rotation, job enrichment, project assignment, attachment, secondment, exposure to external learning situations etc. have very limited applications.

f) In Malta, there is no external institution /company providing courses and/or consulting services for technical training addressed to employed personnel

g) There is no institution capable of providing industrial training methodology courses (Training of Trainers), with the exception of pedagogical biased seminars from the University and ITU (Instructor Training Unit) which, on a small scale and with little resources, principally covers trade school level instructors training.

h) Managerial training is provided by external institutions /companies (MISCO, Malta University Services, FOI, Chamber of Commerce, Government-controlled Organisations etc.) but:

- It is done on a small scale and does not cover much of the real training needs in the field.

- But for a few exceptions, it is only on a catalogue basis, and it is not customized.

- It principally covers classic managerial themes such as communication, motivation of personnel, introduction to cost accounting and finance for supervisors and the like.

- Courses and seminars are normally of a very short duration which means that attainment of skills is questionable (There have been exceptions but without great impact on the general pattern).

- Courses and seminars are not always designed against the real industrial and cultural environment of Malta, which may imply that training provided could be even detrimental to specific work organisations of the Country (Some training, managerial training especially, sometimes does more evil than good).

3. **In the absence of industrial training there is the tendency to rely on technical education (or school-based vocational training) as a surrogate to cope with the skill demand of industries, indeed, with little satisfaction.**

a) Industries, with a few exceptions, ask for ready-made workers and address themselves to the education system, which feels the pressure and tries to a certain extent to respond but cannot, objectively, really comply with such a specific skill demand.

b) The confusion betweeen technical education and industrial training must be dispelled. The role of Technical Education is to provide a broad-base technical preparation, geared to the labour market demand, for occupational categories. From there on, training for specific specialisations, specific processes, equipment and procedures, continuos up-grading of skills etc. is the role of industrial training.
(Between the two, there is obviously some overlapping.)

4. **There is a problem of Human Resources Management and Development practices**

Generally speaking, in Malta based industries, 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, it seems that there is no practice of a "merit system" for advancement, at least, it is not the rule. Incentives and motivation 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 improved once at the job. Certainly, an improvement in this area will greatly contribute towards the total asset of skilled manpower.

5. **As to the backbone of industry: Managers, Engineers, Supervisors, and HTD Level Technicians, they show a great shortage of managerial skills and industrial mentality.**

Generally speaking, school qualifications are not missing, technical skills are often to be improved, sometimes in quantitative terms (numbers) and sometimes in qualitative terms (performance improvement or new skills) but, all in all, the situation is not so bad. Instead, what appears to be a general complaint is the lack of managerial skills and industrial mentality of middle managers and often also of upper-level management.

Managerial skills and attitudes required are:

a) Management of personnel skills, such as communication skills, motivation of workers, team-work, leadership, and so on.

b) Economics oriented attitudes and skills: the company as an economic and financial enterprise; cost-effectiveness of production; budgeting and cost-accounting familiarisation; the cost of accidents and breakdowns etc.

c) Organisational skills and knowledge: planning and scheduling, work procedures, information system tools, company's organisational structure, roles and job descriptions etc.

d) Intellectual transversal skills: problem solving, learn how-to-learn, know-how transfer and teaching skills etc.

6. Instructional methods and examination system at school need to be improved.

There are many complaints in the industrial environment about the preparation of secondary school leavers (11 years of schooling). It appears that frequently they are "functionally illiterate",i.e. they are poor as speakers, communicators, report writers, and document readers. In additon, 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 instructional methods. Students are taught to pass examinations. These are generally written exams and on the test format (mostly prepared by or for an overseas certification body). Results: students learn how to pass a test or a quiz. Moreover, instructional methods are magistrocentred and not learner centred; they are based on individualistic study and on the adherence to the programme/subject matter and not to skill acquisition. It is not a surprise that social skills, team work, oral communication, writing skills are not learned at school.

(Instructional methods and the "qualification" bias do not change much in higher level education, and this partly explains the shortage of social and managerial skills once the students enter working life).

7. There is too much reliance on overseas devised curricula, syllabi and certification in the school system.

Excessive reliance on overseas devised curricula, syllabi and examination patterns (G.C.E., C & G, BTEC,E.E.B, etc.), though very useful as a reference paradigma and as resource saving, is somehow detrimental to the instructional system in as far as:

- It hinders the growth of a locally based curriculum development or instructional design capability.

- Does not always fit the Maltese exigencies. Customization is possible and, at a certain extent, practiced but the lack of a curriculum development culture often leads to a customization geared upon

teaching staff capabilities more than on instructional needs of the Maltese economy.

- Even in the United Kingdom, the traditional certification system is undergoing major restructuring, under the lead of the National Council for Vocational Qualification (NCVQ).
Following a report on vocational qualifications in England and Wales (1986), a Government White Paper set the lines for change. A major weakness was singled out in the widening gap between the training delivery systems and the occupational needs.

  The system which is presently being developed is structured on two basic principles:

  * Competence Based Qualifications;

  * Employment-led Setting of Standards of Performance.
  All awarding bodies and training institutions must re-direct their actions and programmes, taking as a reference the newly elaborated National Vocational Qualifications.

  Naturally the new system is thought to be dynamic, modifying with the time according to experience, changes in the environment, opportunities and constraints. Simply cloning the system to Malta would be very naif, however much may be learned from that experience.

8. **In Technical Education the effectiveness of Apprenticeship Schemes is questionable**

   a) Apprenticeship schemes, ESTS (Extended Skill Training Scheme) and the incoming TAS (Technician Apprenticeship Scheme), by which students spend, as in the present arrangements, up to six months per year in a sponsoring work organisation, are in themselves a good idea in as far as they provide for a sort of training by doing and industrial exposure.They are also a form of compensation for the lack of industrial training in the first phases of the working life of workers, but there is no method, poor oganisation and very little control.
   Besides:

   - The working part (6 months in a year and even the 3+2 formula, three days in a school and two at work) seems really too much for a scheme that is still "educational". It substracts precious time from basic instruction and does not add much to practical skills.

- Students very seldom get any form of training.

- They are often used as cheap labour.

- There is no structural form of programme, monitoring and guidance system.

- There are no trained tutors or assigned expert resources to instruct the students and assess their performance and the training structure efficiency.

The Ministry of Education is aware of the many weaknesses of the schemes, and has plans and ideas to improve their effectiveness e.g. better planning and monitoring system, trained tutors either from industry or from Education when industries are too small or cannot cope with these themselves, assessment by an external body to ascertain results and so on. Ideas and plans are still to be implemented.

b) Moreover, there is a strong need for integration and coordination between the various actors in the schemes: Ministries of Education, Industry and Social Policy, Trade Schools, Technical Institutes, Industries, FOI and students.

9. **The real bottle-neck in the training delivery system is the shortage of trained and professional staff.**

This applies to Technical Education, School-based Vocational Training and, even more, to Industrial Training.

The skills shortage regards teachers, instructors and tutors, both in terms of subject matter (contents) expertise and istructional methods.

It concerns even more the shortfall of other critical professional profiles of any well-geared training system, i.e. Training Managers and Coordinators, Job Analysts, Training Methodologists (Training R & D), Curriculum Developers or Instructional Designers, Courseware Designers, Audiovisual Expert, On-the-job Training Specialists, Trainers of Trainers, Training Needs Analysts, Training Evaluation and Testing Experts, Computer-Based Training Specialists etc.

In addition, motivation is a great problem amongst educators and training staff at all levels, from University down to trade 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 join the education and training careers.

10. **There is a sort of discrimination against Technical Education, though things are changing.**

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

b) 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 less passes are enough. This adds to parents and students perception of technical studies as a choice of second value. The by-the-side choice to follow Higher Secondary School stream for remedying passes does not help the situation at all.

c) For University course of studies, a Technician has to spend from 4 to 5 years in a technical institute after completing the secondary school cycle, while through the sixth form path (lyceum), only 2 years are sufficient.

d) The phenomenon is further worsened by a traditional unfavourable background in Maltese historical and cultural values, by which industrial jobs are disregarded in favour of public or commercial occupations, even if in the latter case, remuneration may be comparatively lower. Generally speaking, there is a white-collar and job-security syndrome, coupled with overemphasis on academic and university studies, in terms of status and career chances.
(Many ideas and actions are being or shall be implemented to dispel prejudices and show the opportunities that technical education and industrial careers may offer).

11. **Women are practically absent from technical studies and industrial careers**

This represents an untapped source of precious resources considering that women perform many jobs very well, among these, scientific and/or high-tech jobs, sometimes even better than men.

The Ministry of Education is fully aware of the problem and plans to favour the intake of women to technical

studies; among others, the establishment of a technician level course of studies for Electronic Servicing.

12. **It seems that in Malta's industrial workforce, there are basically two layers of workers:**

- the executor level, which requires very little investment in training.

- high-skill level personnel, which requires great investment in training.

This is not only a Maltese trend; whatever considerations it may induce, it is a fact that the second group deserves great attention as it is becoming ever more a strategic resource for business success, especially in high-tech industries.

The first group, that is the executor level workforce, deserves the provision of learning opportunities so as to have the chance for keen and willing personnel to up-grade their skill-level.

13. **In terms of high-tech industry exigencies of skilled manpower, the critical point seems to be at the technician level, especially Higher Technician Diploma holders.**

a) What is needed is a flexible and multiskill technician, with a broader and somehow different base than the present ones. It is not a quantitative need but rather a qualitative one. Electronic, mechanical and electrical are a case in point:

The electronic must be able to perform also simple mechanical and electrical tasks, to service pneumatic and hydraulic measure and control devices and look after installation and simple servicing of automation software. The mechanical must be able to adapt himself to automated processes, CNC machinery and understand the basics of electrotechnics and computer controlled processes and machinery. The electrical must have a rather good base of industrial electronics. Besides, they all must be brought up to a good level of skill in group work, trouble-shooting, communication, planning techniques, creativity and initiative.

The end result should be a technician who is flexible and capable of quick changes in working roles; a quick learner, with the capability to work in a team, to transfer his know-how to others and to contribute actively in innovation processes. Additional and continuos in-house training and self-learning will adapt this worker to a wide range of functions and duties.

b) OTDs are of little use for high-tech industries and are often used as cheap labour.

c) University technical graduates seem quite all right, both in terms of quantity and quality, even if they start from a poor base in terms of managerial skills.

14. It appears that as it regards industrial electronic technicians the Fellemberg Institute can well cope with the demand, particularly if with the help of the Swiss Government.

- The end occupational profile is being redefined according to industrial needs.
- Curricula and syllabi are being revised accordingly.
- All the training staff will undertake training courses in Switzerland.
- Moreover, the Institute already has a curriculum oriented to the provision of a broad-base technician (Electronic with mechanical skills). What is missing is especially pneumatics, hydraulics and industrial computing.

In addition, the capacity could be easily increased, provided new staff and equipment are supplied.

What is needed, for the present intake (lately passed from 20 to 40), is the addition of new equipment, programmed exercises for the 3th and 4th year, and possibly some additional training of trainers, when not provided by the Swiss.
(e.g.:curriculum development, courseware design etc.)

15. **For the mechanical and electrical technicians demand, the Institutes of Paola, Naxxar and Gozo, meet the exigencies in quantitative terms, although action has to be taken to improve:**

- The quality of teaching staff
- Curricula and syllabi
- Equipment
- The relationship with the labour market demand.

16. **There are other requirements from industry which must be taken into consideration by Technical Education, especially when numbers become consistent, among these:**

- Tool makers, mould makers, die makers at OTD and HTD level.
  A Precision Engineering Centre would soon cope with these occupations, even if the implementation seems at a still point.
  The same applies to refrigeration technicians.

Others are:

- CAD/CAM Designers
- System analysts
- Chemical laboratory technicians.
- Technological laboratory (measures,testing and certification) technicians.

17. **There is a critical problem of communication and coordination between all institutions concerned with the provision, "maintenance" and development of Human Resources (The various Ministries, FOI, Industries, University, Institutes, Parastatals etc).**

One may, in fact, find here and there a clear awareness of problems, plenty of good ideas and incoming initiatives, a general goodwill by all parties, but everything seems to be done, if ever implemented, in isolation.

Islands within the Island, this is the feeling one has when touring one organisation after the other in Malta.

The only efficient channel of communication appears to be personal contacts.

Malta's based industries tend to be self-sufficient or

linked with an ombelical cord to their parent companies abroad. There is no merge of services, very little reliance on local suppliers, 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 and therefore, a well-thought, synergetic and coordinated effort on the part of all parties concerned.

3. SUGGESTIONS

The general objective is the improvement of the training capacity and capabilities of the Country in order to cope with an ever increasing demand of highly skilled technical personnel.

The guiding principles of any action should be:

- Top-down power for devising and implementing training policies, structures and activities.
- Strong coordination amongst all parties concerned.
- **Competence Based Training.**
- Stress on the **methods** for providing efficient, effective and job-oriented training.
- Stress on professionally competent staff.
- Human resources as the keystone for the rapid economic development of Malta.
- Capability to "govern" the training innovation from Malta and to "choose", where necessary, outside training services and products.
- Implant of a multiplier effect for improving training competences, with exploitation also of managers and other know-how holders.
- Involvement of employers in training planning and policies.
- Development of flexible and highly mobile training resources which can respond tc short term traning needs

Moreover, two facts must be taken into account when planning for any improvement in the training system:

- The problem of **small numbers** : Starting with an overall population of 350,000, a labour supply of 130,000 of which only 32,000 for the manufacturing industries and a diversified industrial setting, the number of persons for any family of occupations is objectively small and shortly saturated with specific training schemes.

  This principally means that the target model of the Maltese skilled worker should be a multi-skill,

flexible and versatile one, capable to adapt to multi-function roles and to moving organizational and technological settings.

It also implies that more attention should be paid 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. But in the long run, the right method of doing things achieves saving of money and resources. In addition, consider that there is no alternative.

- The problem of **exposure** to standards, models and procedures, which, until they are not present in Malta, are to be found overseas.
  This is the case, for example, of new training methods or new management techniques.

Specific suggestions are:

1. To set-up a Human Resources National Committee (HRNC), with power above all parties and representation of all institutions concerned, for deciding on policies, organisation, structures, resources and procedures regarding the full cycle of human resources endowment and development on a national level, including obviously education, industrial training - HRD policies and practices. (See Annex C)

2. To set-up a National Training Agency.
   The idea is not new and is now being incorporated into the new Employment Training Corporation (ETC) presently under way within the framework of a new act, the "Employment Services Act". The Training Agency, functionally accountable to and backed by the Human Resources National Committee will look after industrial and managerial training, the diffusion of human resources management and development methods and techniques.

   Envisaged functions of the Training Agency of ETA, include:

   - To establish and run an "Observatory on the labour market and on technological innovation", the aim of which will be the continuos up-dating of the demand and offer of skilled manpower, both in quantitative and qualitative terms.

     For the purpose it is suggested to exploit, among other sources, the data bank of the National

Council for Vocational Qualifications (NCVQ - UK) and relative advisory assistance. This could be very useful, provided that it is not taken as "The Model," but is simply considered as a reference-point and resources saving tool.

- To maintain a continuos dialogue with the industries in order to integrate technological innovation incidence in manpower development schemes .

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

- To provide consultancy services to industries, and particularly small industries on HR training and development: job analysis, training needs assessment , course design, training methods, OJT programmes and procedures, selection of external training opportunities, manpower planning procedures and formats, job-grading, performance appraisal, potential assessment tools etc.

  The purpose here is not to permanently substitute the role that industries must play in the field of HRD, but to help in establishing a HRD culture and to fill the gaps in the industrial system, leading it towards maturity and towards a satisfactory level of "self-sufficiency" .

- To favour the private initiative in the field of training services offer.

- To diffuse, through seminars and direct assistance, a culture of effective HRM & HRD practices and tools in all work organisations.

- To diffuse modern training methods and techniques, both off-the-job and on-the-job.

- To provide training of trainers courses and seminars.

- To diffuse the utilisation of modern audiovisuals and computer-based training media.

- To organise technical training courses and seminars on a "filling-the-gap" basis.
  If, for example, several industries need the same type of course and there is no other reliable source available, or a new industry is being established and it cannot cope, for a period, with

the training of critical vocations, the NTA (charging for the services) may put its professional personnel at work in order to "fill the gap" (obviously, with the help of external resources).

- To help industries in establishing an in-service training and human resource developement system.

- To establish and run a Resource Centre made up of:

  . A Self Learning Centre, where workers may come and go at any time and on a voluntary basis for self-study and open-learning.
  The Centre will have books, magazines, training manuals, audiovisuals, computer-based training hardware and software and ....two or three tutors to guide the users.

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

- To run managerial courses that other private and public institutions cannot provide (or in conjunction with them).
  To run, for example, institutional post secondary / post lyceum or technical institute and post graduate basic managerial courses (also open to already employed personnel).

N.B. Direct provision of courses and services by the Training Agency should, in the long, run be left as much as possible to private initiative.

More general suggestions are:

3. To strenghten and better equip the ITU (Instructors Training Unit) to look after training methods, aids and training of trainers of the Technical Education System. Naturally, close collaboration between the Training Agency and the ITU must be ensured by the integrating role of th Human Resources National Committee.

4. To define roles and interrelationship between technical education and industrial training.

5. To introduce in the educational system:

- Learner-centred instructional methods
- Active 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 and rendering responsible the students in their own process of learning
- Social skills training.
- Group study.
- Trasversal skills such as: learn how-to-learn techniques, problem-solving, trouble-shooting, project work, reasoning skills, report writing and so on.
- Audiovisual media: hardware, software and the competency to exploit them.
- Oral examinations and more tuned and updated performance tests
- Curriculum development or instructional design capabilities (from macro programmes to the single unit of instruction and of practical exercise)

This latter point is the most important one. Curriculum development should mirror 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 benefitting from curricula which prepare them with the skills, attitudes, and technical orientation which fits them for employment in a constantly developing industrial world of work. Moreover, curriculum development must reflect in the area of manpower endowement and development the Government' economic and social strategic guidelines and policies.

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

7. To eliminate any objective discrimination between academic and technical course studies.

8. To create the conditions for women to join technical education and technical careers.

9. To foster managerial training, in general.

10. To induce industries to play (and to pay) their part in the building-up of a reliable and skilled labour force.

This regards particularly in-service training (see point 2 and 4 of Findings, page 9 and 11 respectively)

11. To influence public opinion as regards industrial jobs and technical studies.

12. To "re-develop" Apprenticeship Schemes in terms of objectives, times, organisation, methods, control and professional resources.

13. To refurbish the training equipment of the trade and technical schools.

14. To foster the impact and effectiveness of the Guidance and Counseling Services of the Education Department, especially as regards technical education and industrial careers.

15. To ameliorate recruitment, remuneration and work-conditions 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

16. To strongly push towards the improvement of methods and organisation of the training delivery system, both educational and industrial, with special attention to the training and updating of trainers.

17. To establish a cadre of teaching staff that will be the propagators of new technologies.

18. To improve the relationship between University and the productive sector for reciprocal benefit.

19. To ameliorate the system of evening classes for workers.

20. To foster the measures of crash training programmes for workers who need redeployment.

21. To take advantage of the know-how available in the country, by setting for instance the conditions for exploiting the know-how holders as propagators, part-time instructors, OJT tutors, technical advisors for curriculum development and courseware preparation.

4. PROPOSALS

Within the framework of "outside" assistance, the following guidelines are suggested:

- The Maltese themselves must improve their own training system. Outside assistance shall therefore contribute towards their self-reliance.

- Concentration of effort should concern the "methods" of education and training and the enhancement of professional qualities of the training staff at managerial and instructional level.

The options are presented in an hierarchical order of priority, which also considers a scaled order in funding provision. The first option is the keystone for long-run improvement.

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

OPTION 1: METHODOLOGICAL ASSISTANCE

a) Consultants are to be engaged for an established time-period, in terms of man-years, and deployed to the National Training Agency.
The type of experts and the duration of the assistance may be discussed with the Employment Training Corporation.
An indication of the type of experts is listed here below,under two sub-options to select from:

Sub-option a1: Ideal team

- expert in HRD	for 2 man/ years
- expert in industrial training	for 2 man/ years
- instructional designers	for 1 man/ years
- job analysts/researchers for establishing an"observatory on labour market and on technological innovation"	for 3 man/ years
- media specialist	for 1 man/ years
- expert in managerial training	for 1 man/ years
- informatics specialist	for 1 man/years
	Total: 11 man/years

Rough estimates of external costs:

11 m/y x 12 months x 12000 USD = 1584000 USD
+ 25% extra costs 396000

total 1,994,000 USD

Sub-option a2: Key-resources team

- expert in HRD for 2 man/ years
- expert in industrial training for 2 man/ years
- job analysts/researchers for 2 man/ years

Total: 6 man/years

N.B.: Job descriptions are in Annex E

Rough estimates of external costs:

6 m/y x 12 months x 12000 USD = 864000 USD
+ 25% extra costs 216000

total 1,080,000 USD

The essential condition of such assistance is the presence of qualified Maltese specialists or personnel to be qualified who may learn from foreign experts.

Remunerations and journeys shall be at the expense of the financing institutions. The Maltese Government shall pay for accomodation and living as well as local costs.

b) **COURSES OF TRAINING METHODOLOGY FOR TRAINERS**

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

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

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

N.B. One course will be dedicated to the development of competences in the field of computer-based training, in order to create the first group of Maltese experts capable of exploiting advanced training technology.

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

The choice may be amongst 2 sub-options : courses fully abroad, and courses in Malta with overseas study tours for instructional designers and training managers.

Rough estimates of external costs:

b1 - Sub-option overseas

- Living and other students expenses abroad	
56 weeks * 7 days * 15 pres. * 150 USD =	882,000
- Delivery (Teaching and logistics)	
56 weeks * 5 days * 2000 USD =	560,000
- Course design and training material	300,000
- Air tickets (130)	160,000
- Study tours	80,000
total	1,982,000

b2 - Sub-option Malta with study tours abroad (2 weeks)

- Delivery	
56 weeks * 5 days * 3000 USD (2 persons)	840,000
- Course and training material	300,000
- Living and other students expenses abroad	
15 days * 75 persons * 220 USD	250,000
- Air tickets	100,000
- Domestic transport abroad	30,000
- Host training institutions fees, abroad	100,000
total	1,620,000

OPTION 2: OVERSEAS COURSES FOR TECHNICAL INSTRUCTORS IN NEW TECHNOLOGIES

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

This type of action involves formal courses, study tours and attachment periods at leading institutions in the specific field required.

The average duration of such training activity is around 3 months. It may take place on individual basis or, much better, in small groups.

It is envisaged as an hypothesis to budget 90 man/months (30 instructors in three years.)

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

Rough estimates of external costs:

- Living and other students expenses abroad	
90 m * 30 days * 220 USD	594,000 USD
- Courses	
90 m * 22 days * 300 USD/day	594,000
- Air tickets (75)	90,000
total	1,278,000 USD

OPTION 3: COURSES ABROAD FOR A NUMBER OF TECHNICIANS REQUIRED IN THE ELECTRONIC AND HIGH TECH INDUSTRY

Entry requirements: HTD, as a general rule.

These are post-diploma or post-graduate technical courses, which cover a time-span that varies from 2 - 3 weeks to even 2 - 3 months.

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 is possible to foresee 540 man/weeks (90 technicians in three years).

Rough estimates of external costs:

- Living and other students expenses abroad	
540 w * 7 days * 220 USD	850,000 USD
- Courses	
540 w * 5 days * 300 USD/day	810,000
- Air tickets (100)	120,000
total	1,780,000 USD

OPTION 4: INTENSIVE CAMPAIGN OF INSTRUCTIONAL METHODOLOGY TRAINING FOR TEACHERS/PROFESSORS OF THE "ACADEMIC" 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:

- From teacher to learner-centred instruction;
- Introduction to active methods: learning-by-doing, role-playing, brainstorming, group work etc.
- Utilisation of audiovisuals;
- Social skills training;
- Formative evaluation and not only summative evaluation (exams);
- The teacher as a designer of his instructional units;
- Precise definition of learning objectives;
- Control of learning results;
- Etc.

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

Although the intervention is technically simple, it must however be accurately prepared ,also considering that it has an effect on curricula, examinations, organisation and expectations. If this proposal is accepted, an experimental application is suggested.

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

- Study and definition of the actual interventions and of the seminars and workshops to foster appropriate responsiveness. Approximately 7 man/months are envisaged.

- Preparation of teaching material: a relatively modest cost, 4 man/months and printing and editing costs.

- Holding of 6 experimental courses: 4 man/months.

- Adaptations: 3 man/months.

- Project management: 2 man/months

Rough estimates of external costs:

- Consultants 20 man/months * 12000 USD	=	240,000
Extra costs, 25%		60,000
total		300,000

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

a) Completion and up-dating of the teaching equipment in the Fellemberg Institute.

b) Supply of particularly important equipment for advanced technology in the Paola, Naxxar and Gozo Technical Institutes.

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

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

For this option, a rather precise feasibility study is necessary for all the above.

SUMMARY OF COST ESTIMATES FOR THE VARIOUS OPTIONS
(expressed in US$)

OPTION 1: METHODOLOGICAL ASSISTANCE

CONSULTANCY:

Sub-option a1: Ideal team

1,994,000

Sub-option a2 :Key-resouces team

1,080,000

COURSES OF TRAINING METHODOLOGY FOR TRAINERS:

Sub-option b1: Overseas

1,982,000

Sub-option b2: Malta with study tours abroad

1,620,000

OPTION 2: OVERSEAS COURSES FOR TECHNICAL INSTRUCTORS

1,278,000

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

1,780,000

OPTION 4: INSTRUCTIONAL METHODOLOGY TRAINING FOR TEACHERS/PROFESSORS OF THE "ACADEMIC" EDUCATIONAL SYSTEM - MALTA

300,000

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

not evaluated.

SUGGESTED PHASING OF IMPLEMENTATION

During the meeting held in Vienna in May 1990, it was considered to suggest as priorities the implementation of Options 1 and 3, and precisely:

- Sub-option 1.a2: (Methodological Assistance - Key-resources team)
  Estimated Cost: 1,080,000 US$

- Sub-option 1.b2: (Methodological Assistance - Courses of Training Methodology for Trainers, held in Malta with study tours abroad.)
  Estimated cost: 1,620,000 US$

- Option 3: Courses Abroad for a Number of Technicians of the Electronic and High-tech Industries
  Estimated cost: 1,780,000 US$

The other options may be implemented at a later stage.

5. ANNEXES

ANNEX A

LIST OF INTERVIEWS

ANNEX A

LIST OF INTERVIEWS

- SELECO(Malta)Ltd,	Mr.L.Bosa, GM
- ELECTROMATIC Ltd,	Mr.Charles J.Cauchi, MD
- SGS-THOMSON,	Mr.Daniel Mercieca, Assistant Manager Mr.Felix Borg, Training Manager
- DOWTY(Malta)Ltd ,	Mr.Charles Fiorentino, Head of Mang.Services
- MERIT(Malta)Ltd,	Mr.Gunter Merten, Chairman
- BRANDSTATTER,	Mr.Carmel Farrugia, Production Manager Mrs.Antoinette Carvana, HR Manager
- FARSONS,	Mr.Teddy Cilia, Training & HRD Manager Mr.Arthur Muscat, Manager
- FELLEMBERG Inst.	Mr.Zammit D.Lawrence, Head of School
- PAOLA Tech.Inst.	Mr.Joseph Gauci, Assistant Head
- NAXXAR Tech.Inst.	George J.Vella, Headmaster
- UMBERTO CALOSSO School,	Mr.Emmanuel Zahra, Headmaster
- ITU (Instr.Train.Unit)	Mr.J A Zahra, Head of Unit, and his collaborators
- UNIVERSITY	Prof.Robert Ghirlando
- MINISTRY of INDUSTRY,	Mr.John Dalli, Parliamentary Secretary for Industry
- MINISTRY of EDUCATION,	Mr.Frederick Fearne, Director of Education
- ETA	Mr.Joe R Aquilino, Chief Executive
- FOI	Mr.Edwin Calleja, Secretary General Prof.Victor Ferrito, HRD Committee

ANNEX B

LIST OF INDUSTRIES AND TRAINING INSTITUTIONS VISITED

ANNEX B

LIST OF INDUSTRIES AND TRAINING INSTITUTIONS VISITED

In **ITALY**, the following industries and training institutions

were visited:

* ISTITUTO INTERNAZIONALE AGNELLI,
  Corso Unione Sovietica 312,
  10135 Turin.

* ILO
  INTERNATIONAL CENTRE FOR ADVANCED TECHNICAL AND VOCATIONAL TRAINING,
  125, Corso Unita' d'Italia,
  10127 Turin.

* ISTITUTO SALESIANO S.ZENO,
  Via Don G. Minzoni, 50
  37138 Verona.

* POLITECNICO DI TORINO,
  Corso Duca degli Abruzzi,
  00128 Turin.

* PHILIPHS,
  Via Philips 1,
  20052 Monza (Milan).

* SELECO S.p.A,
  Viale Treviso 15,
  33170 Pordenone.

* OLIVETTI
  Via Jervis 77,
  10015 Ivrea (Turin)

* ISFOL, (ISTITUTO PER LO SVILUPPO
DELLA FORMAZIONE PROFESSIONALE DEI LAVORATORI)
Via Bartolomeo Eustachio 8,
Rome.

* HAY MANAGEMENT CONSULTANTS,
Via Legnano 6,
20121 Milan.

In the **UNITED KINGDOM**, the following industries and training institutions were visited:

* THE NATIONAL COUNCIL for VOCATIONAL QUALIFICATIONS,
222 Euston Road,
London NW1 2BZ.

* THE NATIONAL COUNCIL for EDUCATION TECHNOLOGY,
3 Devonshire Street,
London WIN 2BA.

* SHEFFIELD SKILLCENTRE,
Richmond Road,
Sheffield S13 8HT.

* BLACKPOOL AND THE FYLDE COLLEGE,
Ashfield Road,
Bispham Blackpool Lancashire FY2 0HB.

ANNEX C

TENTATIVE DRAFT CF THE HUMAN RESOURCES NATIONAL COMMITTEE

ANNEX C

TENTATIVE DRAFT OF THE HUMAN RESOURCES NATIONAL COMMITTEE

Justification

The Human Resources National Committee (HRNC) shall have decision-taking, informative and co-ordinating functions, on all matters concerning the full cycle of Maltese human resources endowement and development, with the aim to serve the economic development of the Country, caring as well for an equilibrated social and cultural enrichment of the population as a whole, and of the individual citizen.

The focus of this action will be 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:

- Power above all parties concerned.
- Participation of all relevant parties.
- Reliance on a subordinated decision-making technostructure able to devise options of policies, procedures, facilities, methods, funding, staff requirement and qualification, and scheme of implementation and technical assistance.

The above-mentioned technostructure will be made-up of two bodies with their own specific aims and functions, but working as closely as possible in a synergic way under the guiding lines of the HRNC.

One of the bodies, the Education Innovation Unit, will be the expression of the education environment and will be attached to the Ministry of education. The other, the Training National Agency, will be the expression of the economic and employment world, dealing particularly with industrial and managerial training, employement problems and Human Resouces Development methods and practices; it will part of the Employment Training Agency accountable to the Ministry of Social Policy. Hence, the two bodies will be functionally subordinated to the HRNC, and hierarchically to their respective Ministries.

Composition

The Committee shall be chaired by the Prime Minister himself on the more crucial issues, or by an authoritative

representative of the Prime Minister Office, delegated for the purpose by the PM.

- A Committee Secretary, nominated by the PM, upon suggestions of the Committee, shall act as the permanent point-of-reference, prepare and co-ordinate the sessions.

- A part-time secretariat function,which shall be accountable to the Committee Secretary, shall be provided by the P.M. Office.

- The composition of the Committee shall be:

    - Chairman PM Office
    - Permanent Secreatry of the Committee
    - Representatives from:
        Ministry of Industry
        Ministry of Education
        Ministry of Social Policy
        FOI
        Chamber of Commerce
        Employment Training Agency
        Trade Unions.

  Other representatives may be summoned, according to the relevance of their presence, from the following:

    - The University
    - Trade and Technical Institutes
    - Private managerial and industrial training companies
    - Academic schoos
    - The Association of Engineers
    - The National Council of Science and Technology.

Functions of the Committee

a) Decision-taking functions

The HRNC shall submit to the Government for approval, on a regular base and/or upon request, authoritative views on:

1. Changes, adjustments, and innovations to be brought to the education and training delivery systems, as well as in-house HRD policies and practices.

2. Mobilization of resources necessary for establishing short, medium and long-term programmes in the economic sectors of the Country.

3. Proposals on policies, procedures, facilities, organisation, funding, methods, schemes and programmes in the education, training and HRD fields.

4. Suggestions on staff requirements, conditions of work, remuneration and training of public education and training institutions personnel.

b) Informative functions:

The HRNC shall assure that information is properly gathered and conveyed to the Government and all interested audiences, on relevant issues regarding the human resources asset of the Country, such as:

1. Labour market offer and demand evolution, possibly on the base of a comprehensive and comprehensible classification of vocational qualifications and the information gathered by a permanent observatory on the labour market.

2. National industrialization problems, especially in respect of technological innovation, market trends, changing work organisation settings and whatever else could affect the human factor in terms of availability, skills requirements and short and long-term personnel development needs.

3. The state-of-the-art of methods and tools for providing the right skills, in the right number, at the right moment in the right place (Manpower planning and development).

4. The evolution of methods and schemes in education and training in more industrialized countries.

5. Full information through media, press, and direct briefings on all new schemes, directives, programmes, innovations etc. to be introduced.

6. Organisation of meetings, debates, workshops for discussing and sharing problems and innovations concerning the national workforce.

c) Co-ordinating functions:

- The Committee shall liaise with and bring together all parties concerned, mediating the various exigencies and the different points of view, in the light of integrating all forces for an everlasting drive towards the improvement of human resources for the economic and social development of the nation.

  For the purpose, the Committee must be composed of the largest representation as possible of all bodies and institutions having a responsibility and/or an interest in the human factor, with the only limitation dictaded by cost-effectiveness of the work to be carried out.

MEETINGS OF THE HRNC

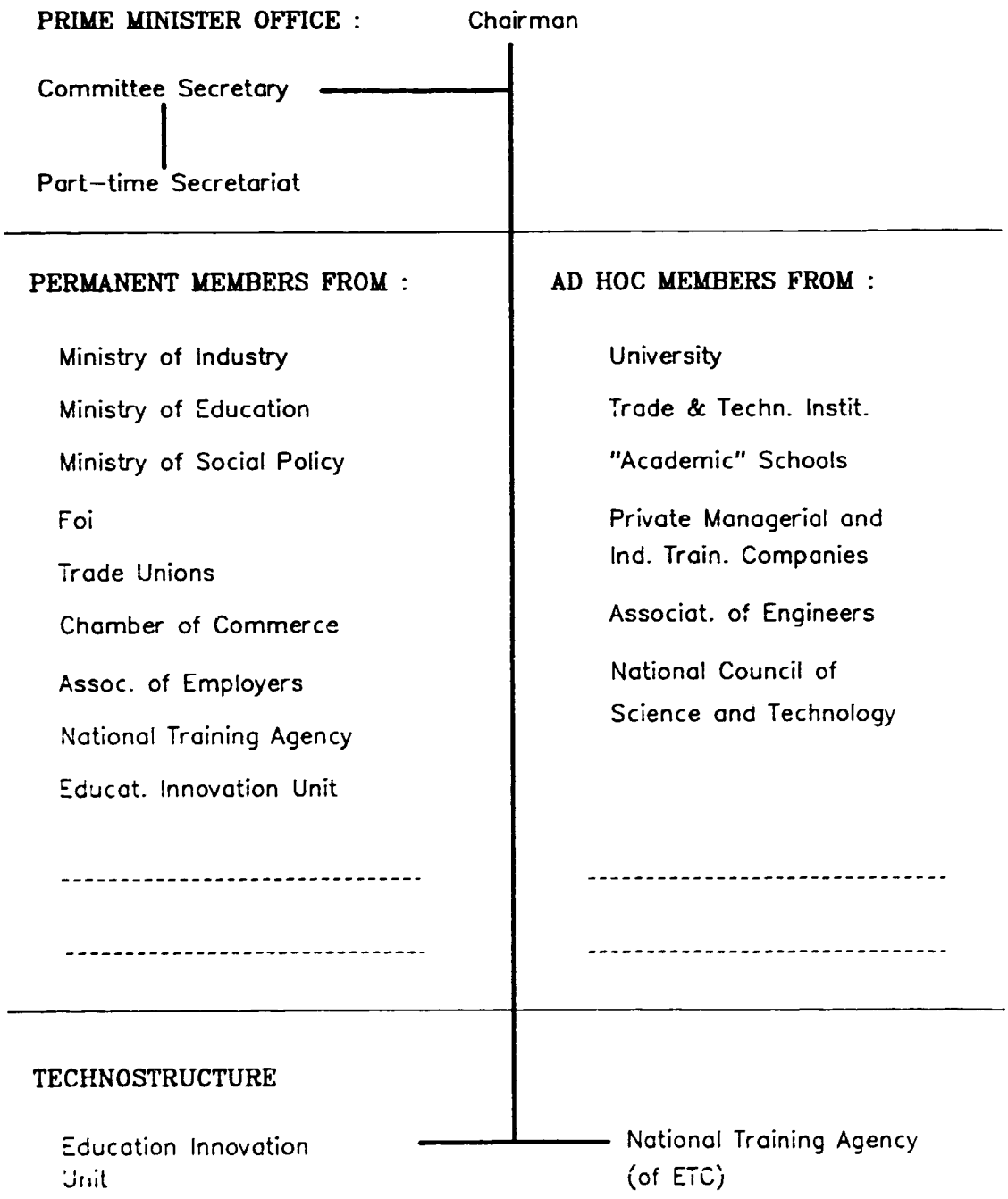
The meetings of the Human Resource National Committee should be held on a regular basis and when necessary.

As a general rule, the initiative of establishing the calendar of meetings shall be the duty of the Permanent Secretary to the Committee.

When working groups are constituted for particular issues, they should fix meetings until that issue is resolved and specific solutions suggested.

Consider that technical decison-making and studies should be asked to or brought by the technostructure, made-up of a Technical Unit from the Ministry of Education and the National Training Agency of the Employment Training Agency.

ORGANIZATION STRUCTURE



ANNEX D

INVESTIGATION APPROACH AND QUESTIONNAIRES

ANNEX D

INVESTIGATION APPROACH AND QUESTIONNAIRES

INVESTIGATION APPROACH:

With the close collaboration of MDC's Staff, the survey in Malta was based on the following sources of information:

a) Relevant documentation

b) Two questionnaires, one administered to electronics and supporting industries and the other to Technical Institutes.

c) A number of interviews -about twenty -, conducted with the help of predefined interview guides and aimed to collect information from key-persons in the electronics and supporting industries, in the educational and training institutions and in public institutions and associations concerned.

d) A few meetings and interviews, towards the end of the survey period, with selected knowledgeable people for exchanging ideas and testing relevant information.

The target population for data collection and need determination was:

1	2
ELECTRONICS (AND SUPPORTING) INDUSTRIES	TECHNICAL EDUCATIONAL AND INDUSTRIAL TRAINING DELIVERY SYSTEM

3

GOVERNEMENT & PUBLIC INSTITUTIONS AND ASSOCIATIONS CONCERNED

1. ELECTRONICS AND SUPPORTING INDUSTRIES, respondents amongst:

   - Top Management and Assistants (Preferably HRD Managers)

   Amongst the envisaged destinees of the questionnaires and selected interviews:

Electronics Companies:

. AMS Industries
. Delta Ltd
. Electrmatic
. Eurocomponents
. HOB Electronics
. SGS Thomson Microelectronics
. Seleco Ltd
. Prominent Fluids

Electrical Companies

. Deeco Ltd
. Elma Motors Ltd
. Medit.Power Electric
. Medelec Switchgear
. Jogal Enterprises
. Cable Works Ltd
. Med. Lighting Ltd
. Nola Ltd
. Technical Ind.Prod.

Plastic Injection

. Cimoplast Ltd
. JB Plastics Ltd
. Modern Plastic
. Plastichem
. Toly Products Ltd
. Universal Plastics
. Brand Int Ltd
. MCL Components
.
.

Tool/Mould Facilities

. Dowty(M) Ltd
. Piltz Ltd
. Inmold Ltd
.
.
.

Stamping/Casting/Sheet Metal

. Abeco Ltd
. Atlas Tools
. Bezzina Bros
. BIM Ltd
. Metalfit Ltd
. Jogal Enterprises
. Stainless Steel
.

2. **TRAINING DELIVERY SYSTEM**, respondents amongst:

- University, technical faculties Heads and Profs
- Technical Institute Managers and Senior Staff
- NTA Representatives
- In-house industrial training structures, HRD and Training Managers, of electronics and supporting industries.

3. **GOVERNMENT AND PUBLIC INSTITUTIONS AND ASSOCIATIONS**, respondents amongst:

- Industry, Social Policy and Education Ministries's Representatives
- MDC's Staff
- Representatives from FOI
- Researchers and professionals who provided significant contribution to the investigation exercise.

SCHEME OF REFERENCE FOR DATA GHATHERING

Sources code:

A Documentation and plans
B Ministries of Industry, Labour, Education
C MDC
D Electronics industries
E Supporting industries
F Specialists and Researchers
G NTA
H University
I Technical Institutes
J Institute of Management
K Employers' Association, FOI, Chamber of Professional Engineers, Unions, Chamber of Commerce etc.

CONTEXT

Area of concern	Information sought	Sources	By means of: Tool	By means of: Source
1 ELECTRONICS & SUPPORTING INDUSTRIES SITUATION a) as to date b) as by development plans (3 years)	1 WHAT TYPE/SUBSECTOR 2 PRODUCTS/SERVICES 3 PROCESS/EQUIPMENT 4 TECHNOLOGY LEVEL 5 PHISYCAL SIZE 6 ECONOMIC TURNOVER 7 MANPOWER STRENGHT 8 ORGANIZATION 9 EXPANSION DRIVE 10 NATIONAL PLAN	A -DOCUMENTATION & DEVP. PLAN C -MDC D -ELECTRONICS INDUSTRIES E -SUPPORTING INDUSTRIES F -SPECIALISTS & RESEARCHERS	. REVIEW OF DOCUMENTATION AND DEVP.PLANS . QUESTIONNAIRE . INTERVIEW	-> A -> D-E -> C-D-E-F
2 MANPOWER ANALYSIS a) as to date b) Projected (3 years)	1 MANPOWER SUPPLY AT NATIONAL & SECTOR LEVEL 2 TECHNICAL LABOUR SUPPLY TO ELECTRONICS AND SUPPORTING INDUSTRIES 3 WORKFORCE STRENGHT & CLASSIFICATION 4 TECH.JOB POSITIONS AND JOB DESCRIPTIONS 5 QUANTITATIVE DIMENSIONS OF SKILLED STAFF BY JOB TITLE 6 QUALIFICATION PROFILES OF KEY TECH.ROLES (difficult to find or to train) 7 HRD POLICY AND PRACTICES 8 PROBLEMS WHICH CAN BE ASCRIBED TO THE HUMAN FACTOR	A -DOCUMENTATION & PLANS B -MINISTRIES OF LABOUR & INDUSTRY C -MDC D -ELECTRONICS INDUSTRIES E -SUPPORTING INDUSTRIES F -SPECIALISTS RESEARCHERS	. REVIEW OF DOCUMENTATION AND DEVP.PLANS . QUESTIONNAIRE . INTERVIEW	-> A -> D-E -> B-C-D-E-F

MAIN FOCUS

3 TRAINING DEMAND AND NEEDS ASSESSMENT	1 SKILLED WORKFORCE SHORTFALL (Quantitative) 2 SKILL TECHNICAL SHORTAGES (Qualitative) 3 CRITICAL SKILLL SHORTAGES both quantitative (No. of persons) and qualitative (Inadequate performance) 4 TRAINING DEMAND AS EXPRESSED BY RESPONDENTS 5 TENTATIVE GROUPING OF WOULD-BE TRAINEES	A -DOCUMENTATION AND PREVIOUS STUDIES B -MINISTRIES OF INDUSTRY, LABOUR, EDUCATION C -HDC D -ELECTRONICS INDUSTRIES E -SUPPORTING INDUSTRIES F -SPECIALISTS RESEARCHERS G -NTA J -INSTITUTE OF MANG K -FOI, EMPLOYERS' ASSOCIATION, etc.	. REVIEW OF DOCUMENTATION AND PREVIOUS STUDIES . QUESTIONNAIRE . INTERVIEW . MEETING/GROUP DISCUSSION	-> A -> D-E -> B-C-D-E-F-G -> C-F-G....
4 TRAINING DELIVERY SYSTEM a)Technical Educat. b)In-house Training structures	1 AVAILABLE STRUCTURES 2 CAPACITY 3 SKILL CATEGORIES TRAINED 4 QUANTITATIVE OUTPUT 5 TRAINING STAFF (Strenght & competencies) 6 FUNDING 7 EQUIPMENT 8 HARDWARE 9 SOFTWARE 10 CURRICULA & SILLABUSES 11 COURSEWARE:printed, A/V, computer based 12 TRAINING METHODS 13 COURSE DESIGN 14 COHERENCE BETWEEN TRAINING DEMAND & TRAINIG OFFERED 15 MAIN STRENGHTS 16 MAIN CONSTRAINTS 17 EDUCATIONAL SYSTEM OUTPUT 18 EDUCATIONAL SYSTEM OFFER vs.INDUSTRY EXIGENCIES	A -PREVIOUS STUDIES AND SURVEYS B -MINISTRIES OF EDUCATION C -HDC D -ELECTRONICS INDUSTRIES E -SUPPORTING INDUSTRIES F -SPECIALISTS RESEARCHERS G -NTA H -UNIVERSITY I -TECH. INSTITUTES J -INSTITUTE OF MANG	. REVIEW OF DOCUMENTATION AND PREVIOUS STUDIES . QUESTIONNAIRE . INTERVIEW . MEETING/GROUP DISCUSSION	-> A :-> D-E ->: :-> I -> B-C-D-E-F G-H-I-J-K -> C-F-G....

THE ADMINISTRATION OF QUESTIONNAIRES:

MDC's staff was kindly requestd to present the two questionnaires to all concerned industries and technical institutes, and, after a while, visit the respondents helping them, where necesary, to fill-in the documents.

THE INTERVIEWS:

The consultants, together with MDC's Staff, conducted approximately 20 interviews, based on the questionnaire information and on the interview guide.

Indicatively, the respondents were:

- Electronics and supporting industries, 6
- University, 1
- Technical Institutes, 4
- Ministry of Industry, 1
- Ministry of Social Policy, 1
- Ministry of Education, 1
- Specialists and reserchers, 2
- ETA (Education and Training Agency), 1
- FOI, Employers' Assoc. and other relevant bodies, 2

MINISTRY OF INDUSTRY

SURVEY ON TRAINING NEEDS AND TRAINING CAPACITY AND CAPABILITY RELATED TO THE ELECTRONICS INDUSTRY

Q 1

QUESTIONNAIRE FOR THE ELECTRONICS AND SUPPORTING INDUSTRIES

COMPANY : . . . . . .

CONTACT PERSON FOR FURTHER INFORMATION,

NAME & TEL. : . . . . . .

MALTA, March 1990

With the assistance of the

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

FOREWORD

The Government is deeply concerned with the development of the electronics industry in Malta.

Strategies and plans to attract foreign investors and to ensure efficiency in the electronics sector, find a stumbling block in the shortage of properly qualified technical staff.

To overcome this structural weakness, action has to be taken to improve the training delivery system so as to better cope with urgent and long-term skill staff requirements related to the electronics industry.

To this end, a survey is being implemented, with the financial and technical assistance of UNIDO (United Nations Industrial Development Organization), to check present and projected needs as well as the present training delivery system as regards the electronics and supporting industries occupations.

This questionnaire is intended to contribute with basic information and ideas. We attach much importance to it and we therefore ask your kind collaboration, at the best you can.

All information will be treated in strict confidence.

STRUCTURE OF THE QUESTIONNAIRE

A. GENERAL INFORMATION

1. Company's general data
2. Products/Services
3. Level of technology
4. Organization chart
5. Foreseeable changes and innovations

B. THE HUMAN FACTOR

1. Workforce strenght by main occupation categories
2. Problems which may be ascribed to the human factor
3. Human resource management and development practices

C. TRAINING EXIGENCIES

1. Workforce by level of education and by adequacy of job qualification
2. Skilled (technical) workforce: Strenght, shortfalls, and qualification suitability
3. Critical skilled (technical) staff shortfalls and skill shortages
4 Training demand for current and projected needs (in three years'time)

D. COMPANY's TRAINING STRUCTURE AND ACTIVITIES (IF ANY)

1. The Company's training system
   a. Facilities
   b. Equipment & aids
   c. Software and courseware
   d. Type of courses / training activities
   e. Total yearly output of trainees
   f. Main categories of personnel trained
   g. On-the-job and other forms of training
   h. External training
2. Training methods and training staff
3. Training for new entrants.
4. Comments on the national education system

A. GENERAL INFORMATION

A.1 COMPANY's GENERAL DATA:

Name of company _____

Address _____

Telephone No.s _____

Contact person _____

Shareholding
(Local/Foreign Country %) _____

Financial turnover _____

Number of employees _____

A.2 PRODUCTS/SERVICES

A.2.1 (For the electronics industries only):

In respect of the "Product Tree of the Electronics Industry by Subsector",(see Annex 1) here attached, please place your Company - marking, in the blank boxes, the products you are presently producing with a X and the ones you plan to produce in the near future (3 to 5 years) with a O.

Add any other products not mentioned in the list.

A.2.2 Main products or services: (both for the electronics and supporting industries)

Denomin. & brief description	Present output	Projected (5 years)

A.3 TECHNOLOGY LEVEL:

Please give an objective assessment of the technological complexity of your production processes and equipment, differentiating by units/sectors, if necessary.

Consider:

- The level of **automation**: 1) high, 2)average or 3) rather low
- **Up-to-dateness**:1) up-dated,2) good enough but not the last cry, 3) you plan to make substantial changes.
- **Productivity** compared to European standards: 1) absolutely at European standards, 2) near to, 3) rather below standards.
- **Control instrumentation**:1)digital /computer based, 2)electronic/analogic, 3) pneumatic, electromechanics.
- **Learning investment**: 1)requires high level of instruction and long/complex off-the-job and on-the-job training; 2) good instruction and good on-the-job training, 3) G.C.E. "O" Level or below and a short period of hands-on training.

UNIT/PROCESS/SECTOR	:AUTOM.	:UP-DAT.	:PROD.	:INSTRU.	:LEARN.
	:	:	:	:	:
	:	:	:	:	:
	:	:	:	:	:
	:	:	:	:	:
	:	:	:	:	:
	:	:	:	:	:
	:	:	:	:	:

A.4. ORGANIZATION CHART

Please attach the Organization Chart of your Company.

If the Chart is out-dated, or important sections of the Company are undergoing major changes, sketch the organization structure here below.

A.5 FORESEEABLE CHANGES AND INNOVATIONS

We would like to know whether your Company has planned or is undergoing physical expansion, organization changes, technological renewal, product or market diversification, substantial augmentation of production and personnel.

Consider the next five years, and especially all that is particularly relevant to job competencies and training needs.

Physical expansion:_____

_____

Organization changes:_____

_____

Technological renewal:_____

_____

Product/Market diversification:_____

_____

Production augmentation:_____

_____

Personnel augmentation:_____

_____

B. THE HUMAN FACTOR

B.1 WORKFORCE STRENGHT BY MAIN OCCUPATION CATEGORIES (see Table B.1)

You are requested to fill-in the same type of questionnaire - inclusive of some additional information - that was sent by the Department of Industry to all the manufacturing industries in 1989 for the "Survey on Employment of Un/skilled Personnel in the Manufacturing Industry".

Please note:

- By engineers, technologists and technicians, we mean professionally qualified personnel.

- Engineers who are also managers, are to be classified as engineers.
  The same applies to technicians who are also supervisors, and so on.
  Consider that engineers, technicians and skilled workers are the main target of investigation.

- Industrial engineers and work-study engineers shall be classified as "Others".

- If the delineation between skilled and semi-skilled operators is not very clear, think in terms of their education and the training needed in order that they could properly carry out their job.

- The distinction between managers and supervisors shall be according to the Company's classification.

- By "Others", we mean all other indirect workers such as cleaners, drivers, etc.

- By "Optimum Number of Employees", we mean the ideal number of people you would like to have had at that date, but either you did not find them on the local market, or you had surplus.

- Under "Projected Number of Employees", we ask you to look ahead, anticipating your envisaged requirements as at three years to date.

- Under "Present Shortfall", put the difference between the "Optimum Number of Employees" and the present ones.

- Under "Projected Shortfall", put the difference between the "Projected Number of Employees" in three years' time and the present ones.

- Under "Turnover", provide your statistical or estimated figures showing, in percentage, the personnel of each category who left the Company in the last year.

B1. – WORKFORCE BY MAIN OCCUPATION CATEGORIES

OCCUPATION CATEGORY	EMPLOYEES ON THE PAYROLL AS AT 31.3.1990					OPTIMUM NUMBER OF EMPLOYEES AS AT 31.3.90	PRESENT SHORTFALL	PROJECTED NUMBER OF EMPLOYEES REQUIRED AS AT 31.3.93	PROJECTED SHORTFALL
	REGULAR		ON DEFIN. CONTRACT	TOTAL	TURNOVER %				
	M	F							
MANAGEMENT									
SUPERVISORY									
ADMIN/CLERICAL									
ENGINEERS :									
MECHANICAL									
ELECTRICAL									
ELECTRONIC									
TECHNICIANS :									
MECHANICAL									
ELECTRICAL									
ELECTRONIC									
PROCESS									
OPERATIVES :									
SKILLED									
SEMISKILLED									
UNSKILLED									
OTHERS :									

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B.2 COMPANY's PROBLEMS WHICH MAY BE ASCRIBED TO THE HUMAN FACTOR(SEE TABLE B.2)

The next page describes a list of problems encountered by many enterprises, at one time or another, and which are often ascribed to inadequacies of the "human factor."

Please tick off, on the left of the list, the items you recognise as a problem engendered by skill shortage or poor behaviour on the part of the personnel of your Company.

Then, on the right, assess the level of inadequacy of work force in respect of the problem (high, moderate, low - and whether it is not only a workforce problem - e.g. also a problem of organization, procedures, technology, leadership etc.)

At the extreme right, rank with 1, 2 and 3 the most crucial problems in terms of magnitude or importance which can be ascribed to weaknesses of the human factor.

Use the blank part of this page to precise and/or comment this aspect.

B2. – WHICH OF THE FOLLOWING PROBLEMS AFFECT YOUR COMPANY AND ARE DUE TO WEAKNESSES ON THE WORKFORCE SIDE ?

	PROBLEM	LEVEL OF INADEQUACY OF WORKFORCE		NOT ONLY A HUMAN FACTOR PROBLEM	RANKING 1 HIGHEST 2 SECOND 3 THIRD
		HIGHLY BASED	MODERATELY BASED		
1 ☐	LOW OUTPUT	☐	☐	☐	—
2 ☐	HIGH ACCIDENT RATE	☐	☐	☐	—
3 ☐	STANDARDS AND QUALITY NOT MET	☐	☐	☐	—
4 ☐	SPECIFICATIONS NOT FOLLOWED	☐	☐	☐	—
5 ☐	HIGH LABOR TURNOVER	☐	☐	☐	—
6 ☐	EXCESSIVE WEAR AND TEAR ON EQUIPMENT	☐	☐	☐	—
7 ☐	FAILURE TO OBSERVE SAFETY RULES	☐	☐	☐	—
8 ☐	UNTIDINESS OF WORK AREA	☐	☐	☐	—
9 ☐	IGNORANCE OF COMPANY RULES	☐	☐	☐	—
10 ☐	EXCESSIVE MAINTENANCE COSTS	☐	☐	☐	—
11 ☐	CUSTOMER COMPLAINTS	☐	☐	☐	—
12 ☐	DELAYS IN GOODS DELIVERY	☐	☐	☐	—
13 ☐	FREQUENT BOTTLENECKS IN PRODUCTION	☐	☐	☐	—
14 ☐	EXCESSIVE ABSENTEEISM	☐	☐	☐	—
15 ☐	POOR MOTIVATION	☐	☐	☐	—
16 ☐	POOR IDENTIFICATION WITH THE COMPANY	☐	☐	☐	—
17 ☐	POOR PRODUCTIVITY	☐	☐	☐	—
18 ☐	DIFFICULTY IN MASTERING NEW EQUIPMENT	☐	☐	☐	—
	OTHERS (SPECIFY) :				
19 ☐		☐	☐	☐	—
20 ☐		☐	☐	☐	—

B.3 HUMAN RESOURCE MANAGEMENT AND DEVELOPMENT PRACTICES

B.3.1 Manpower planning (the right persons for the right job, at the right time):

Has your Company an overall manpower plan for the near future (3 to 5 years' time):

1. There is an **inventory** system (how many and what kinds of personnel are available), a **forecast** (projected staff needs in 3 to 5 years' time) and a **plan** (ways of covering the gap between the forecast and the inventory.)

   if positive tick here_____

2. There is an inventory of personnel and periodical meetings to assess and decide upon the Company's personnel situation.

   if positive tick here_____

3. The problems of personnel shortfalls are faced when they arise.

   if positive tick here_____

Comments, if any:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

B.3.2. Job descriptions and qualification profiles

Are there regularly up-dated job descriptions and qualification profiles:

1. Job descriptions (main function, responsibilities and duties of a job position) and qualification or professional profiles (experience/knowledge/skills and other minimum requirements to fill a job position) are available and updated for all personnel.

   if positive tick here_____

2. The above applies to management supervisors and highly qualified personnel only.

   if positive tick here_____

3. Job descriptions are available, professional profiles are sketched only if necessary (e.g. in case of a special recruitment campaign).

   if positive tick here_____

4. There is no need for job descriptions and qualification profiles, or there are no job descriptions and qualification profiles.

   if positive tick here_____

B.3.3. Other personnel procedures and tools

Does the Company practise any of the following personnel management and development systems - tick off on the right for positive replies - :

. Career development plans _____

. Individual development (for key personnel) plans _____

. Succession plans (replacement charts) for senior staff _____

. Job position evaluation _____

. Performance appraisal _____

. Potential assessment _____

. In-house training _____

Comments:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

B.3.4 Personnel dedicated functions:

In the Company organization, which are the functions/sections directly in charge of personnel management and development.

Please specify the function, job positions and number of incumbents.

Dept./Section/Unit	staff	
	Job position	No.

C. TRAINING EXIGENCIES

This section is fundamentally based on the formats and information of the "Skills and Training Needs Survey (SNTS)" run by the EDUCATION - INDUSTRY UNIT in July 1987, concerning the entire industrial sector of the Country.

We now seek the same and additional information, up-dated and in relation to the electronics and supporting industries.

C.1 YOUR WORKFORCE BY LEVEL OF EDUCATION (actual and suitable) AND BY ADEQUACY OF JOB QUALIFICATON (see Table C.1)

Before filling Table C.1, please note:

- An exemplary list of "Occupations" or "Job titles" may be found in Annex 2. (It originates from Annex II - C of the SNTS report and refers to occupations having at, the survey time, most frequent references to skills to be improved or skill shortages).
  Change and/or freely add to the list.

- For each category of education levels, please indicate the number of incumbents (actual) and desired one (suitable).

- By job qualification, we mean the minimum requirements in terms of experience, knowledge, skills and formal education for satisfactory performance according to occupation or job title standards.

- Please show, for each occupation, whether you think the holders of that job title have a satisfactory job qualification or if they are rather below standard.

C1. – WORKFORCE BY LEVEL OF EDUCATION (ACTUAL & SUITABLE) AND BY ADEQUACY OF JOB QUALIFICATION

OCCUPATION OR JOB TITLE (POSITION HELD)	No. OF EMPLOYEES	LEVEL OF EDUCATION																JOB QUALIFICATION	
		PRIMARY		TECHNICAL		SEC. GRAMMAR		UPPER SECOND.		HIGHER TECHNIC.		DIPLOMA		DEGREE		POST GRADUATE		SATISFACTORY	COULD BE IMPROVED
		ACT.	SUIT.	ACT.	SUIT.	ACT.	SUIT.	ACT.	SUIT.	ACT.	SUIT.	ACT.	SUIT.	ACT.	SUIT.	ACT.	SUIT.		
TOTALS																			

FOR OFFICE USE ONLY

C1. – WORKFORCE BY LEVEL OF EDUCATION (ACTUAL & SUITABLE) AND BY ADEQUACY OF JOB QUALIFICATION

OCCUPATION OR JOB TITLE (POSITION HELD)	No. OF EMPLOYEES	LEVEL OF EDUCATION																JOB QUALIFICATION	
		PRIMARY		TECHNICAL		SEC. GRAMMAR		UPPER SECOND.		HIGHER TECHNIC.		DIPLOMA		DEGREE		POST GRADUATE		SATISFACTORY	COULD BE IMPROVED
		ACT.	SUIT.	ACT.	SUIT.	ACT.	SUIT.	ACT.	SUIT.	ACT.	SUIT.	ACT.	SUIT.	ACT.	SUIT.	ACT.	SUIT.		
TOTALS																			

FOR OFFICE USE ONLY

C1. – WORKFORCE BY LEVEL OF EDUCATION (ACTUAL & SUITABLE) AND BY ADEQUACY OF JOB QUALIFICATION

OCCUPATION OR JOB TITLE (POSITION HELD)	No. OF EMPLOYEES	LEVEL OF EDUCATION																JOB QUALIFICATION	
		PRIMARY		TECHNICAL		SEC. GRAMMAR		UPPER SECOND.		HIGHER TECHNIC.		DIPLOMA		DEGREE		POST GRADUATE		SATISFACTORY	COULD BE IMPROVED
		ACT.	SUIT.	ACT	SUIT.	ACT.	SUIT.	ACT.	SUIT.	ACT.	SUIT.	ACT.	SUIT.	ACT.	SUIT.	ACT.	SUIT.		
TOTALS																			

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C.2 SKILLED (TECHNICAL) WORKFORCE: strenght, shortfalls and qualification suitability
(see table C.2)

We are now exclusively concentrating on engineers, technicians and skilled workers.

We would like to know the establishment (No. of employees on the payroll as at 31.3.1990), the desired number of skilled staff (Optimum No. as at 31.3.1990), the forecasted number as at 3 years' to date (Forecast No. as at 31.3.1993).

We also ask whether the job qualification of present workers is satisfactory or to be improved and, as concerns new recruits (say, school leavers), if the qualification (meaning here educational standard) is good enough or unsatisfactory.

Finally, we ask you to indicate, for each occupation, whether it is difficult to find and/or retain personnel and if there is a need for further long and complex training, after recruitment, to bring incumbents to satisfactory job standards.

C2.a – SKILLED (TECHNICAL) WORKFORCE : STRENGTH, SHORTFALL & QUALIFICATION SUITABILITY

OCCUPATIONS OR JOB TITLES	No. ON THE PAYROLL	OPTIMUM No.	FORECAST No.	JOB QUALIFICATION OF PRESENT WORKERS		QUALIFICATION LEVEL OF NEW RECRUITS (SCHOOL LEAVERS)			DIFFICULT TO FIND OR RETAIN SUITABLE WORKERS			COMPLEX LONG TRAINING NEEDED AFTER RECRUITMENT		
PROFESSIONAL & TECHNICAL PERS.	31.3.90	31.3.90	31.3.93	SATISFACT.	COULD BE IMPR.	GOOD	RATHER SATISF.	POOR	MUCH	AVER.	NOT DIFF.	VERY MUCH	RATHER	NOT MUCH

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C2.b – SKILLED (TECHNICAL) WORKFORCE : STRENGTH, SHORTFALL & QUALIFICATION SUITABILITY

OCCUPATIONS OR JOB TITLES PRODUCTION & SERVICES	No. ON THE PAYROLL	OPTIMUM No.	FORECAST No.	JOB QUALIFICATION OF PRESENT WORKERS		QUALIFICATION LEVEL OF NEW RECRUITS (SCHOOL LEAVERS)			DIFFICULT TO FIND OR RETAIN SUITABLE WORKERS			COMPLEX LONG TRAINING NEEDED AFTER RECRUITMENT		
	31.3.90	31.3.90	31.3.93	SATISFACT.	COULD BE IMPR.	GOOD	RATHER SATISF.	POOR	MUCH	AVER.	NOT DIFF.	VERY MUCH	RATHER	NOT MUCH

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C.3 CRITICAL SKILLED (TECHNICAL) STAFF SHORTFALLS AND SKILL SHORTAGES
(see table C.3)

From the list of C.2, now select the most critical occupations for your firm (splitting them in sub-occupation/specialization, if necessary).

"Critical" means primarily difficult to find or retain, which normally goes together with high level and rare (on the local market) skills and with long/complex industrial training after school graduation.

Of this selected list, please indicate the present strenght, the desired (as to date) and the projected number (3 years' to date).

Then, for each occupation or sub-specialization, indicate which ones are also demanding high and rare skills and/or long/complex training after recruitment.

Finally, for each specialization, show the skills/knowledge which are principally missing or you consider suitable for a good job performance - both for the present workforce and for new recruits (supposing that they are school leavers, and simply just holders of technical-education knowledge and skills).

C3. – CRITICAL SKILLED (TECHNICAL) STAFF SHORTFALLS & SKILL SHORTAGES

CRITICAL OCCUPATIONS (BE AS SPECIFIC AS POSSIBLE)	CRITICAL BECAUSE					MAJOR SKILL SHORTAGES OR SKILLS SOUGHT	
	DIFFICULT TO FIND OR RETAIN			HIGH LEVEL OR RARE SKILLS	NEEDS LONG COMPLEX TRAINING		
	PRESENT 31.3.90	OPTIMUM 31.3.90	FORECAST 31.3.93	YES/NO/ RATHER	YES/NO/ RATHER	IN THE PRESENT WORKFORCE	IN NEW RECRUITS (SCHOOL LEAVERS)

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C.4 TRAINING DEMAND FOR CURRENT AND PROJECTED NEEDS (three years'time)

Considering the possibility to face, both with your own resources and with external assistance as well, the training needs of your Company, please outline the major components of your demand as regards engineer, technician and skilled worker kind of occupations, as well as other important (for your Company) occupations.

For example:

Training for: (occupation, numbers etc.)	Major Training Needs: (skills, knowledge, attitudes, experiences)
- Production operators Technicians level No.10, urgent No.15, next 2 yrs	-Some process related physics (theoretical/practical) -Process control (course & On-the-job)
- Mechanical Maintenance Supervisor Engineer level No.2, any time in 1990	-Planning techniques (WBS, PERT, CPM) -Computer literacy
- Testing engineers Senior engineer level, 2 Junior engineer level, 5 Both urgent	-International quality standards, classification and tests (course) -Specific measurement devices (vendor's like assistance) - .....
- All supervisors	-Accident prevention -Leadership skills - .....

Do not feel confined by the format below; the more specific you are in quantitative and qualitative terms, the better:

TRAINING FOR: (occupation, numbers etc)	MAJOR TRAINING NEEDS (skills, knowledge, attitudes, exper.)

D. COMPANY's TRAINING STRUCTURE & ACTIVITIES (IF ANY)

D.1 THE COMPANY's TRAINING SYSTEM

Your Company has a full-fledged Training Centre:

Yes.... No....

If yes, please describe it, following the questions herebelow.
If you have a less organised training system or you are fully dependent on external supply of education and training, skip the questions which are not relevant to your situation.

a. FACILITIES:

1. Classrooms: No. ....
   Total capacity
   (no. of trainees at one time) .....

2. Training laboratoires/workshops:
   No. .... Type:

3. Training buildings or offices: Total sq.m .....

   A separate Training Centre Yes ... No...

4. Other (library, auditorium, printing room etc).
   Specify:

b. EQUIPMENT AND AIDS

1. Simulators:

   - Type:

   - Purpose of simulator/s:

   - Year of purchase: .....

2. Training laboratory/ workshop equipment:
   Please provide a list and a brief description.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

3. Computer stations

   - For office use, typical configuration: No.....

   - For training use, typical configuration: No.....

4. Other hardware:

- If you make use of other media aids, such as overhead projectors, film projectors, slide projectors, videocassette players, videocameras, audiotape or cassette recorders, TV projectors and the like, please list them, giving the quantity of each item and whether they are up-dated or should be renewed.

c. SOFTWARE AND COURSEWARE

1. - If you make use of audiovisual software (films, slides, videocassetes, audio tape or cassettes), please indicate them and give an estimate of copies and up-to-dateness.

2. - If you use CBT (Computer Based Training) programs, please specify them.
If possible, write the entire list and a brief description of the contents. (Use separate sheets of paper, if necessary).

3. - If you produce part of the written courseware for your courses (training manuals, tests, teaching guides etc), please specify the estimated amount of original copies and the main titles.

4. - If you have a library, indicate the number of titles, the main subjects covered, and if used also for "training" purposes.

d. TYPES OF COURSES/TRAINING ACTIVITIES

Which is the main type of course or training activities you run for your personnel (courses , seminars, workshops) in your training structures? Please also specify the type of destinees and durations. (If possible, kindly attach some samples of the course outlines or even better, samples of programmes).

e. TOTAL YEARLY OUTPUT OF TRAINEES: No.....

f. MAIN CATEGORIES OF EMPLOYEES OR OCCUPATIONS TRAINED:

g. ON-THE-JOB AND OTHER FORMS OF TRAINING

What forms of training activities, other than classroom or training centre courses, are normally undertaken in your Company?

1. Programmed and monitored on-the-job training, please specify:

_____

_____

_____

_____

_____

_____

_____

_____

2. Career development programmes, such as job rotation, job enlargement, job enrichment, attachment, project assignment etc., please specify:

_____

_____

_____

_____

_____

_____

_____

_____

3. Hands-on assisted skill acquisition programmes:

4. Self-learning (supplying material, time and space):

5. Side-by-side familiarisation periods:

h. EXTERNAL TRAINING

Do you send, and /or did you ever send employees to external courses, for overseas training, for evening courses etc?

If yes, please specify what type of training, what kind of occupations are involved and the total number of trainees' as well as the total amount of man/days of training.

D.2 TRAINING METHODS AND TRAINING STAFF

a. In your training system, are there qualified training needs analysts and course designers?

Yes ..... No .....

Comments, if any:

_____

_____

_____

_____

_____

_____

_____

_____

b Have your instructors ever attended courses regarding teaching/training methodology?

Yes ..... No .....

Please specify:

_____

_____

_____

_____

_____

_____

_____

_____

c. Do you think that training of trainers courses could be of some use for your in-house training staff?

No, we are not interested/concerned: .....

Yes, for:
* instructional designers .....
* instructors .....
* training managers and coordinators .....

d. How strong is your training staff body?

* Training managers No....
* Co-ordinators No....
* Instructional designers or senior training professionals No....
* Instructors, full-time No ...
* Instructors, part-time (estimate) No....
* External consultants (estimate) No....
* Others

D.3 TRAINING FOR NEW ENTRANTS (Engineers,technicians, skilled workers)

Are there any occupations of engineers, technicians or skilled workers for which you have to provide significant training for new entrants?

Please indicate the specific kinds of training or new areas of knowledge/skills.

OCCUPATIONS (OR JOB TITLES)	KIND OF TRAINING OR NEW AREAS OF SKILL OR KNOWLEDGE REQUIRED

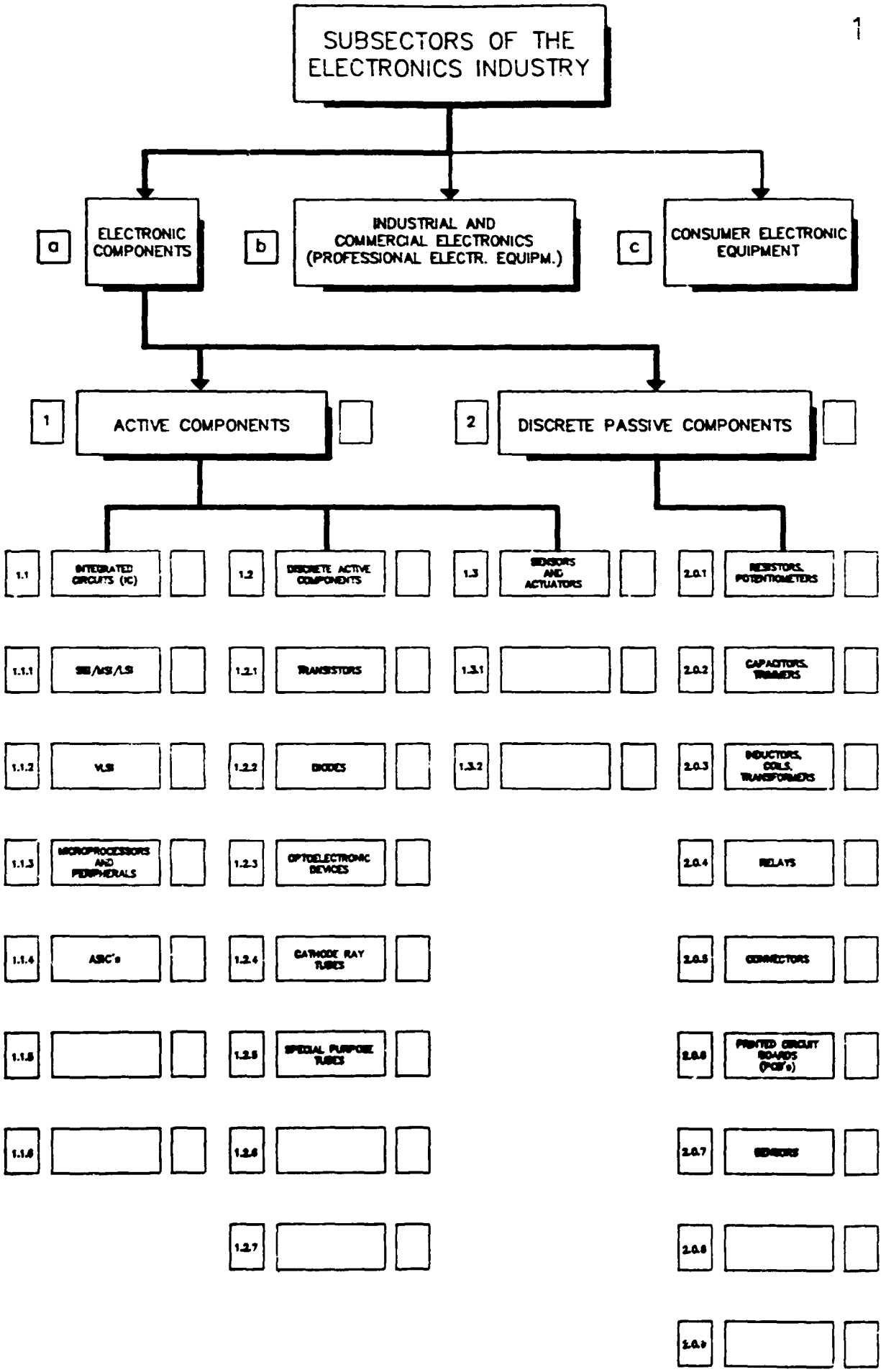
D.4 COMMENTS ON THE NATIONAL EDUCATION SYSTEM

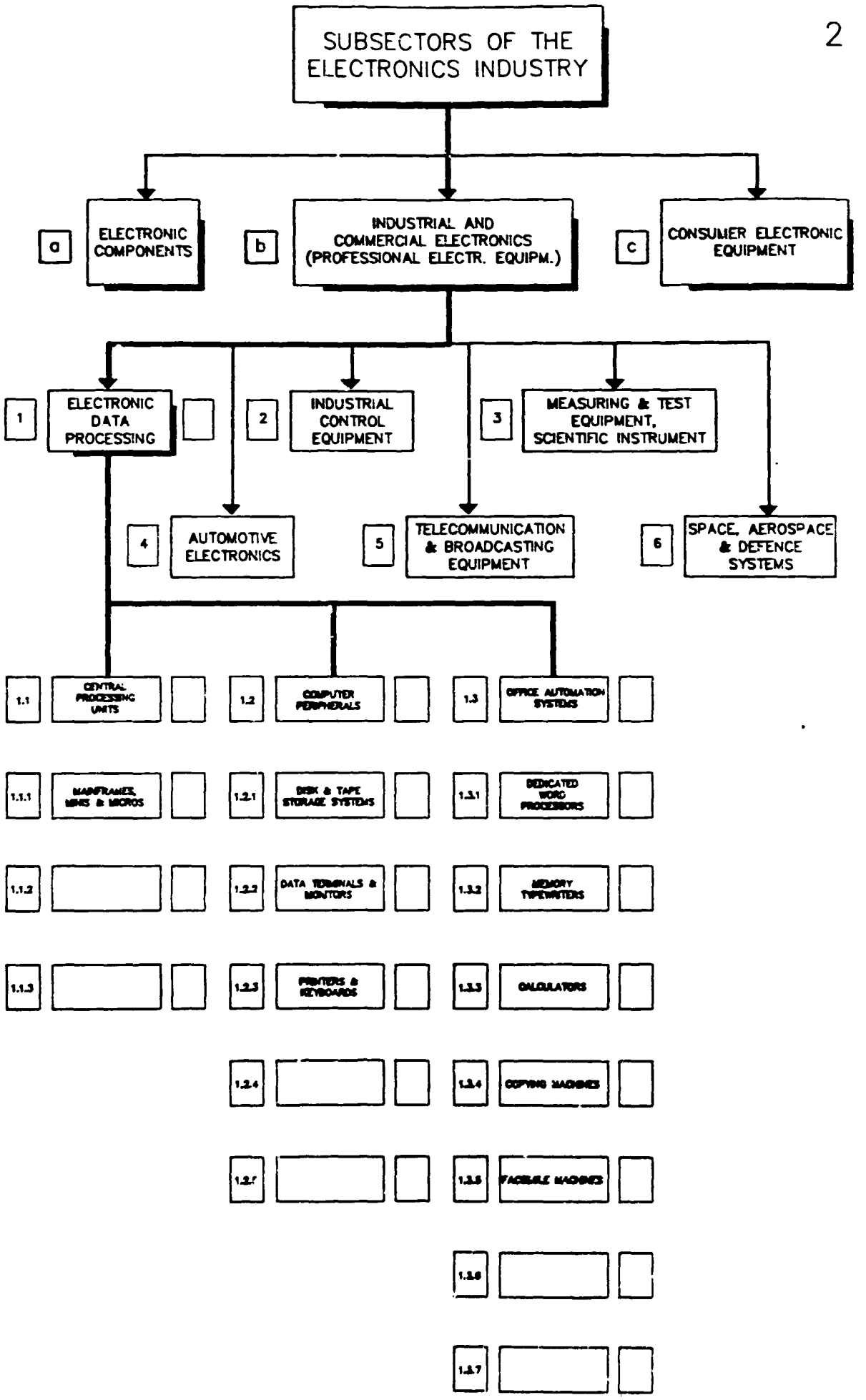
Comment the level of qualification of school-leavers when they come into your firm for recruitment.

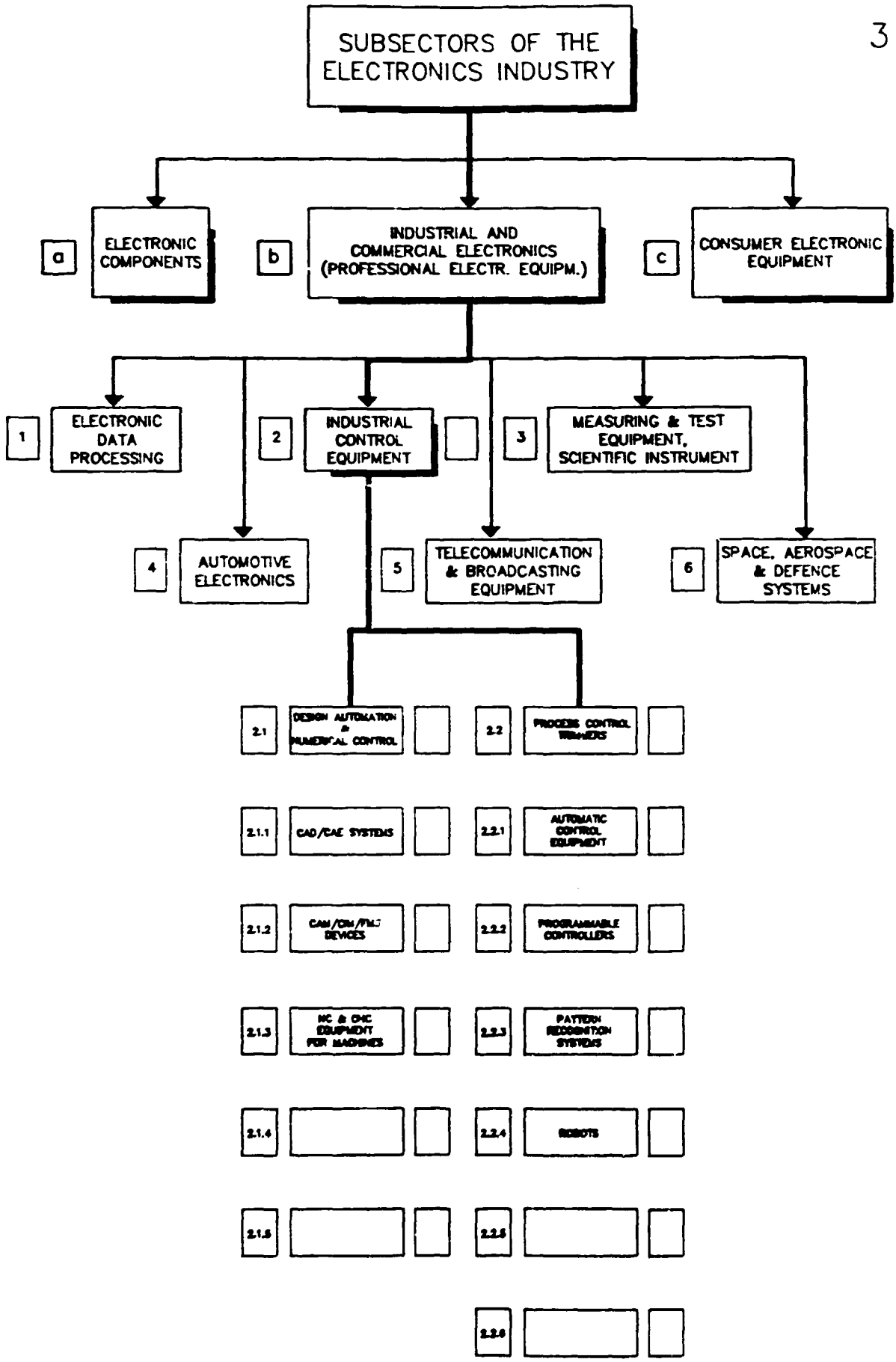
Are you satisfied with their academic and technical preparation, as provided by the national education system? If not, kindly indicate ideas for improvement.

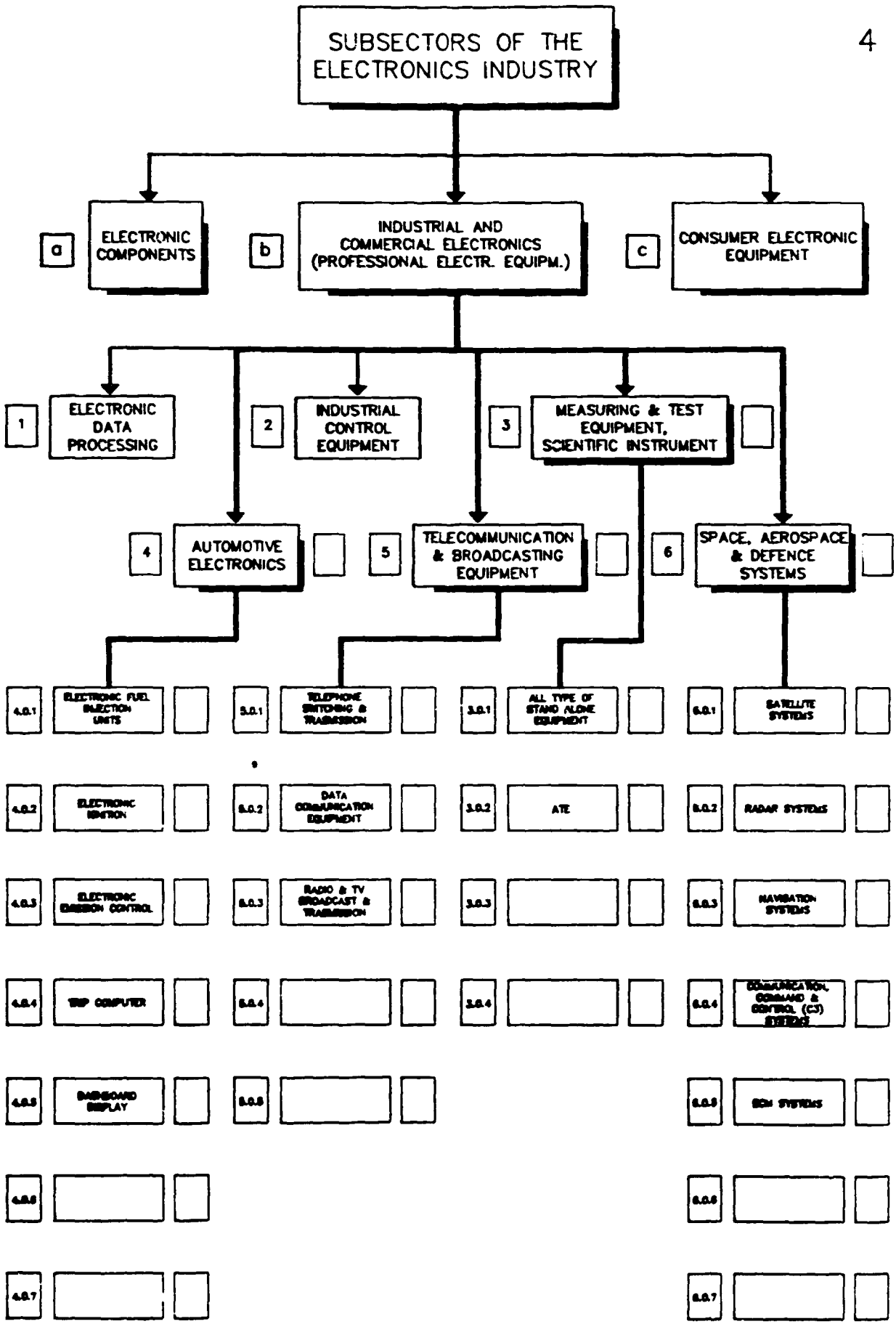
ANNEX 1

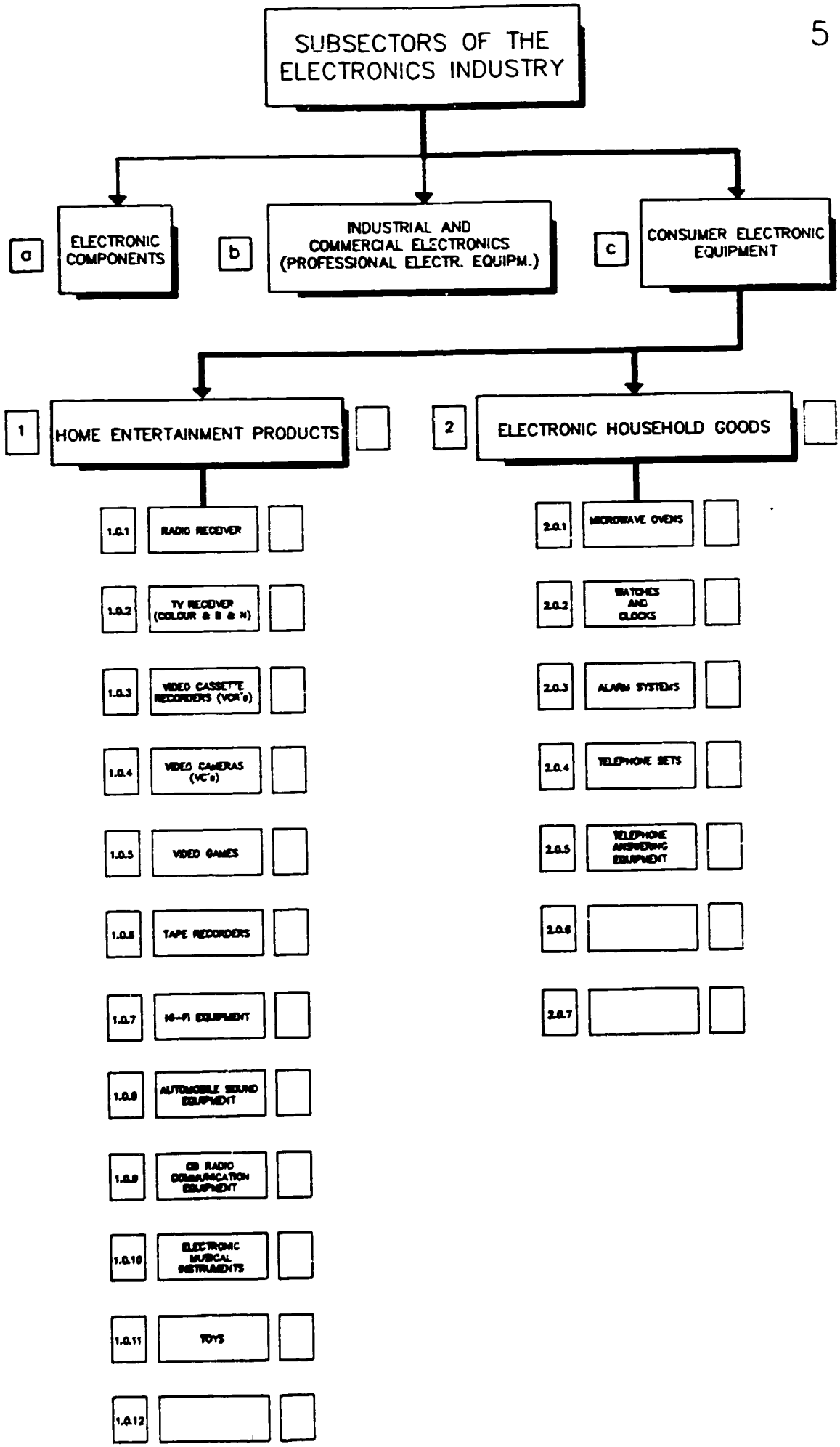
PRODUCT TREE OF THE ELECTRONICS INDUSTRY BY SUBSECTOR


SUBSECTORS OF THE ELECTRONICS INDUSTRY
a
ELECTRONIC COMPONENTS
b
INDUSTRIAL AND COMMERCIAL ELECTRONICS (PROFESSIONAL ELECTR. EQUIPM.)
c
CONSUMER ELECTRONIC EQUIPMENT
1
ACTIVE COMPONENTS
2
DISCRETE PASSIVE COMPONENTS
1.1
INTEGRATED CIRCUITS (IC)
1.1.1
SSI/MSI/LSI
1.1.2
VLSI
1.1.3
MICROPROCESSORS AND PERIPHERALS
1.1.4
ASIC's
1.1.5
1.1.6
1.2
DISCRETE ACTIVE COMPONENTS
1.2.1
TRANSISTORS
1.2.2
DIODES
1.2.3
OPTOELECTRONIC DEVICES
1.2.4
CATHODE RAY TUBES
1.2.5
SPECIAL PURPOSE TUBES
1.2.6
1.2.7
1.3
SENSORS AND ACTUATORS
1.3.1
1.3.2
2.0.1
RESISTORS, POTENTIOMETERS
2.0.2
CAPACITORS, TRIMMERS
2.0.3
INDUCTORS, COILS, TRANSFORMERS
2.0.4
RELAYS
2.0.5
CONNECTORS
2.0.6
PRINTED CIRCUIT BOARDS (PCB's)
2.0.7
SENSORS
2.0.8
2.0.9


SUBSECTORS OF THE ELECTRONICS INDUSTRY
a
ELECTRONIC COMPONENTS
b
INDUSTRIAL AND COMMERCIAL ELECTRONICS (PROFESSIONAL ELECTR. EQUIPM.)
c
CONSUMER ELECTRONIC EQUIPMENT
1
ELECTRONIC DATA PROCESSING
2
INDUSTRIAL CONTROL EQUIPMENT
3
MEASURING & TEST EQUIPMENT, SCIENTIFIC INSTRUMENT
4
AUTOMOTIVE ELECTRONICS
5
TELECOMMUNICATION & BROADCASTING EQUIPMENT
6
SPACE, AEROSPACE & DEFENCE SYSTEMS
1.1
CENTRAL PROCESSING UNITS
1.2
COMPUTER PERIPHERALS
1.3
OFFICE AUTOMATION SYSTEMS
1.1.1
MAINFRAMES, MINIS & MICROS
1.2.1
DISK & TAPE STORAGE SYSTEMS
1.3.1
DEDICATED WORD PROCESSORS
1.1.2
1.2.2
DATA TERMINALS & MONITORS
1.3.2
MEMORY TYPEWRITERS
1.1.3
1.2.3
PRINTERS & KEYBOARDS
1.3.3
CALCULATORS
1.2.4
1.3.4
COPYING MACHINES
1.2.5
1.3.5
FACSIMILE MACHINES
1.3.6
1.3.7


SUBSECTORS OF THE ELECTRONICS INDUSTRY
a
ELECTRONIC COMPONENTS
b
INDUSTRIAL AND COMMERCIAL ELECTRONICS (PROFESSIONAL ELECTR. EQUIPM.)
c
CONSUMER ELECTRONIC EQUIPMENT
1
ELECTRONIC DATA PROCESSING
2
INDUSTRIAL CONTROL EQUIPMENT
3
MEASURING & TEST EQUIPMENT, SCIENTIFIC INSTRUMENT
4
AUTOMOTIVE ELECTRONICS
5
TELECOMMUNICATION & BROADCASTING EQUIPMENT
6
SPACE, AEROSPACE & DEFENCE SYSTEMS
2.1
DESIGN AUTOMATION & NUMERICAL CONTROL
2.2
PROCESS CONTROL TRANSDUCERS
2.1.1
CAD/CAE SYSTEMS
2.2.1
AUTOMATIC CONTROL EQUIPMENT
2.1.2
CAM/CIM/FMS DEVICES
2.2.2
PROGRAMMABLE CONTROLLERS
2.1.3
NC & CNC EQUIPMENT FOR MACHINES
2.2.3
PATTERN RECOGNITION SYSTEMS
2.1.4
2.2.4
ROBOTS
2.1.5
2.2.5
2.2.6


SUBSECTORS OF THE ELECTRONICS INDUSTRY
a
ELECTRONIC COMPONENTS
b
INDUSTRIAL AND COMMERCIAL ELECTRONICS (PROFESSIONAL ELECTR. EQUIPM.)
c
CONSUMER ELECTRONIC EQUIPMENT
1
ELECTRONIC DATA PROCESSING
2
INDUSTRIAL CONTROL EQUIPMENT
3
MEASURING & TEST EQUIPMENT, SCIENTIFIC INSTRUMENT
4
AUTOMOTIVE ELECTRONICS
5
TELECOMMUNICATION & BROADCASTING EQUIPMENT
6
SPACE, AEROSPACE & DEFENCE SYSTEMS
4.0.1
ELECTRONIC FUEL INJECTION UNITS
5.0.1
TELEPHONE SWITCHING & TRANSMISSION
3.0.1
ALL TYPE OF STAND ALONE EQUIPMENT
6.0.1
SATELLITE SYSTEMS
4.0.2
ELECTRONIC IGNITION
5.0.2
DATA COMMUNICATION EQUIPMENT
3.0.2
ATE
6.0.2
RADAR SYSTEMS
4.0.3
ELECTRONIC EMISSION CONTROL
5.0.3
RADIO & TV BROADCAST & TRANSMISSION
3.0.3
6.0.3
NAVIGATION SYSTEMS
4.0.4
TRIP COMPUTER
5.0.4
3.0.4
6.0.4
COMMUNICATION, COMMAND & CONTROL (C3) SYSTEMS
4.0.5
DASHBOARD DISPLAY
5.0.5
6.0.5
BDM SYSTEMS
4.0.6
6.0.6
4.0.7
6.0.7


SUBSECTORS OF THE ELECTRONICS INDUSTRY
a
ELECTRONIC COMPONENTS
b
INDUSTRIAL AND COMMERCIAL ELECTRONICS (PROFESSIONAL ELECTR. EQUIPM.)
c
CONSUMER ELECTRONIC EQUIPMENT
1
HOME ENTERTAINMENT PRODUCTS
2
ELECTRONIC HOUSEHOLD GOODS
1.0.1
RADIO RECEIVER
1.0.2
TV RECEIVER (COLOUR & B & N)
1.0.3
VIDEO CASSETTE RECORDERS (VCR's)
1.0.4
VIDEO CAMERAS (VC's)
1.0.5
VIDEO GAMES
1.0.6
TAPE RECORDERS
1.0.7
HI-FI EQUIPMENT
1.0.8
AUTOMOBILE SOUND EQUIPMENT
1.0.9
CB RADIO COMMUNICATION EQUIPMENT
1.0.10
ELECTRONIC MUSICAL INSTRUMENTS
1.0.11
TOYS
1.0.12
2.0.1
MICROWAVE OVENS
2.0.2
WATCHES AND CLOCKS
2.0.3
ALARM SYSTEMS
2.0.4
TELEPHONE SETS
2.0.5
TELEPHONE ANSWERING EQUIPMENT
2.0.6
2.0.7

ANNEX 2

EXEMPLARY LIST OF OCCUPATIONS

(From Annex II-C of the "Skill and Training Needs Survey Report", by the EDUCATION-INDUSTRY UNIT, 1987; it refers to occupations having at, the survey time, most frequent references to skills to be improved or skill shortages.)

MANAGERIAL AND ADMINISTRATIVE OCCUPATIONS:

General Manager
Production Manager
Administrative Manager
Sales Manager
Budgeting and Accounting Manager
Industrial Relations & Personnel Manager
Administrator (Public Sector)
Stenographic Secretary
Storeroom Clerk/Storekeeper
Finance Clerk
Travelling Salesman
Clerks (Other)
Dispatching & Receiving Clerk
Personnel Clerk
Sales Supervisor (General)
Typist (General)
Receptionist (General)
Office Cashier
Electronic Computer Operator
Filing Clerk
Stock Records Clerk
Travel Agency Clerk

PROFESSIONAL & TECHNICAL OCCUPATIONS

Mechanical Engineering Technician (General)
Production Engineering Technician
Industrial & Commercial Products Designer
Mechanical Engineer (General)
Time & Motion Study Technician
Computer Programmer
Draughtsman (General)
Telecommunications Technician
Electronics Engineering Technician (General)
Heating, Ventilation & Refrigeration Engineering Tech.
Electrical Engineering Technician
Electronics Engineer
Market Research Analyst
Heat, Ventilation & Refrigeration Engineer
Chemists (Other)
Civil Engineering Draughtsman
Methods Engineer
Surveyor
Electrical Engineer (General)
Food & Drink Technologists
Flight Engineers
Commercial Artists
Photographer
Radio & TV Producer
Insurance Underwriter
Production Supervisor & General Foreman
Machine Operators (General)
Machinery Mechanic (General)
Labourers
Sewing Machine Operator
Plant Maintenance Mechanic
Machinery Fitter (General)
Gas & Electric Welder (General)
Tool & Die Maker
Electrician (General)
Quality Inspector
Plastic Injection/Moulding/Machine Operator
Machine Fitter Assembler (General)
Carpenter (General)
Automobile Mechanic
Mobile Crane Operator
Motor-Vehicle Driver (General)
Printer (General)
Textile Machinery Mechanic
Supervisor/Foreman for Foods /Beverages
Supervisor/Foreman for Construction
Woodworking Machinery Mechanic
Construction Steel Erector

Lorry & Van Driver
Woman's Hairdresser
Barber (Hairdresser)
Stone Mason (Construction)
Butcher (General)
Garment Pattern Maker

MINISTRY OF INDUSTRY

SURVEY ON TRAINING NEEDS AND TRAINING CAPACITY AND CAPABILITY RELATED TO THE ELECTRONICS INDUSTRY

Q 2

QUESTIONNAIRE FOR THE TECHNICAL INSTITUTES

INSTITUTE : . . . . . .

CONTACT PERSON FOR FURTHER INFORMATION,

NAME & TEL. : . . . . . .

MALTA, March 1990

With the assistance of the

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

FOREWORD

The Government is deeply concerned with the development of the electronics industry in Malta.

A major effort is under way to attract foreign investors and to improve the overall productivity of the sector.

Special attention is consequently paid to the shortfall of qualified human resources which appear to be a stumbling block in the development of the electronics industry.

To overcome this structural weakness, action has to be taken to improve the training delivery system so as to better cope with urgent and long-term skilled staff requirements related to the electronics industry.

To this end, a survey is being undertaken, with the financial and technical assitance of UNIDO (United Nations Industrial Developemnt Organization), to check present and projected needs as well as the present training delivery system as regards electronics and supporting industries occupations.

This questionnaire is intended to contribute with basic information and ideas. We attach much importance to it and we therefore ask your kind collaboration, at the best you can.

All information will be treated in strict confidence.

STRUCTURE OF THE QUESTIONNAIRE

A. GENERAL

1. General Data
2. Capacity
3. Yearly Output & Enrolment Figures
4. Total Surface Covered
5. Annual Budget

B. TRAINING ACTIVITY

1. List and description of the training activities, curricula and syllabi
2. End qualifications (title, end profile) and certification
3. Number of students per class (min. and max.)

C. FACILITIES

1. Classrooms
2. Laboratories
3. Library
4 Other facilities

D. EQUIPMENT/AIDS/SOFTWARE AND COURSEWARE

1. Equipment and hardware
2. Software and courseware
3. Computer based programs

E. STAFF

1. Total full-time staff
2. Roles, job descriptions and professional profiles of full-time staff
3. Part-time staff (professional)
4. Recruitment of trainers
5 Training of trainers

F. METHODS

1. Training philosophy
2. Course design
3. Persistency of training programmes

G. INSTITUTE-INDUSTRY RELATIONSHIP

1. Stages
2. Training needs assessment and influence on programmes
3. Coherence between labour market training demand and your training offer
4. Special concern in the electronics industry

H. MAIN STRENGHT AND CONSTRAINTS

1. Major strenghts
2. Major constraints
3. Improvements sought

I. COMMENTS

A. GENERAL

A.1 GENERAL DATA:

Name of Institute: _____

Address: _____

Tel. No.s _____

Contact persons: _____

A.2 CAPACITY

A.2.1 Full capacity (max. number of students at any one time) _____

A.2.2. Average capacity: _____

A.3 YEARLY OUTPUT AND ENROLMENT FIGURES

A.3.1. Yearly output of Institute-leavers per stream of specialization:

A.3.2. Yearly enrolment in the same streams:

A.3.3 **Average yearly drop-outs for the same streams:**

A.4 TOTAL SURFACE COVERED:

A.4.1 What is the total ground surface of the Institute's estate?

_____

_____

What is the total surface of the Institute's locales: offices, classrooms, laboratories, etc?

_____

_____

Could the Institute expand the training facilities?

_____

_____

A.5 BUDGET

What is your annual budget, both capital and current one?

_____

_____

B. TRAINING ACTIVITY

B.1. LIST OF COURSES AND OTHER TRAINING ACTIVITIES:

B.1.1. Please list all the courses and other training activities you run.

B.1.2. Can you provide a short description of each, also indicating the type of destinees (entry profile).

B.1.3. Please attach samples of curricula and syllabi

B.2. END QUALIFICATIONS:

B.2.1. What is the end qualification and title of your students?

B.2.2. Are there awarded certificates, national and/or with international awarding bodies? Please specify them.

B.3. NUMBER OF STUDENTS PER CLASS

What is the minimum and maximum number of students per class?

C. FACILITIES

C.1 CLASSROOMS

No.	Sizes:
_____	_____
_____	_____
_____	_____

C.2 LABORATORIES/WORKSHOPS

Do you have laboratories or workshops?
If yes, please specify the following information for each of them: type, size, number of workplaces, main characteristics and main equipment.

_____

_____

_____

_____

_____

_____

_____

_____

C.3 DO YOU HAVE A LIBRARY?

If yes, please specify the following: size, number of reading places, number of volumes and main subject areas covered.

C.4 OTHER FACILITIES (AUDITORIUM, CANTEEN etc.):

Please indicate other important facilities you have and specify the size, man/places, and main characteristics.

D. EQUIPMENT/AIDS/SOFTWARE/COURSEWARE

D.1 EQUIPMENT AND HARDWARE:

Apart from the equipment belonging to the laboratories and workshops that you have already listed in Section C.2, kindly provide information regarding the type, number and up-to-dateness of the following equipment and aids.

D.1.1 Simulators:

If you have simulators - analog or digital - kindly indicate the type, the purpose of the simulator(s), the date of purchase, simulator characteristics, well functioning:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

D.1.2 Overhead projectors:

No.	Up-to-dateness:
_____	_____
_____	_____
_____	_____

D.1.3 Film projectors:

No	Up-to-dateness:
_____	_____
_____	_____
_____	_____

D.1.4 Slide projectors:

No.	Up-to-dateness:
_____	_____
_____	_____
_____	_____

D.1.5 Videotape players:

No.	Up-to-dateness:
_____	_____
_____	_____
_____	_____

D.1.6 Audiotapes or cassette recorders:

No.	Up-to-dateness:
_____	_____
_____	_____
_____	_____

D.1.7 **Videocameras:**

No.	Up-to-dateness:
_____	_____
_____	_____
_____	_____

D.1.8 **Computer stations for office use:**

No.	Up-to-dateness:
_____	_____
_____	_____
_____	_____

Typical configuration and main characteristics:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

D.1.9 Computer stations for training use:
(Computer Based Training)

No.	Up-to-dateness:
_____	_____
_____	_____
_____	_____

Typical configuration and main characteristics:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

D.1.10 TV projectors, electronic projectors, computer LAN and other computer driven hardware.

_____

_____

_____

_____

_____

_____

_____

D.1.11 **Any other training equipment or hardware:**

COMMENTS:

D.2 SOFTWARE AND COURSEWARE:

D.2.1 Films, slides, videocassettes, audiotapes or cassettes.
Please indicate and estimate the number of copies and up-dateness.

_____

_____

_____

_____

_____

D.2.2 Do you make use of transparencies for overhead projectors?

If yes, do you have a "bank" of transparencies?

Who usually produces the transparencies?

_____

_____

_____

_____

_____

D.2.3 Do you have in-house training manuals, teaching guides, tests and exercises?

_____

_____

_____

_____

_____

D.3 COMPUTER BASED PROGRAMS, IF ANY:

If you use CBT (Computer Based Training) programs, please specify the titles, the producer and a brief description of each program.

E. STAFF

E.1 TOTAL FULL-TIME STAFF:

E.2 Please provide a detailed list of your professional full-time staff, specifying their roles, main duties, qualifications, topics/subjects taught and age, as indicated in the annexed document.
(If available, please attach the job descriptions and the professional profiles of the relevant roles: managers, professors/instructors etc).

E2. – INSTITUTE's FULL TIME STAFF (PROFESSIONAL ROLES)

POSITION HELD	MAIN FUNCTIONS	QUALIFICATION	AGE (YEARS)	SUBJECT/AREA OF SKILLS TAUGHT

E.3 If you utilise part-time professional specialists (consultants, teachers, analysts, audiovisual experts etc), please specify : the type of service, the amount of day/months and where they come from.

E.4 How are trainers normally recruited?

E.5 Do your trainers, both professors/instructors and training specialists/managers and coordinators undergo refresher training in their own field and in training methodology?
Have they ever attended courses on teaching/training methodology?

F. METHODS

F.1 COULD YOU BRIEFLY STATE YOUR TRAINING APPROACH/METHODOLOGY.

F.2 COURSE DESIGN

F.2.1 In the case of completely new courses, how much time, in respect of the run-hour (teaching hour), do you normally spend for:

- analysis of training needs and diagnosis of skills/knowledge to be delivered _____/1hr
- course design _____/1hr
- preparation of teaching material and tests _____/1hr

F.2.2 Do you have specialists for training needs analysis,course design, courseware preparation and audiovisual software?

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

F.3 PERSISTENCY OF TRAINING PROGRAMMES

Once they have been designed and run-tested, how many years do objectives, syllabi and contents stand without major renewals?

G. INSTITUTE-INDUSTRY RELATIONSHIP

G.1 STAGES

Do you have an agreement that enables you to send your students to industrial environments for stages, visits or practical exercises?

If yes, please specify which:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

G.2 TRAINING NEEDS ASSESSMENT

G.2.1 Do you normally have a possibility of investigating the labour market requirements in terms of occupations, characteristics, skills necessary, new technologies etc.?

G.2.2 If yes, how do you proceed?

G.2.3 Is the industrial world sensitive to your needs: e.g. by helping you to adjust curricula, by receiving your students for practical training and so on?

G.3 COHERENCE BETWEEN LABOUR MARKET TRAINING DEMAND AND YOUR TRAINING OFFER:

What are the main problems you face in trying to adjust the competencies acquired in the Institute with the ones (type and standard) required by present demand of industries?

G.4 SPECIAL CONCERN IN THE ELECTRONICS INDUSTRY:

Does your Institute contribute, and how, to the skill demand of the electronics industry?

H. MAIN STRENGHTS AND CONSTRAINTS

H.1 STRENGHTS

Please list what - in you opinion - are the main strenghts of your Institute.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

H.2 CONSTRAINTS

Now list the main constraints and which you are presently facing in order to attain the standards of efficiency and effectiveness you deem desirable.

H.3 IMPROVEMENTS SOUGHT

What type of improvements are you planning or seeking in terms of capacity, equipment, curricula, hardware, software, staff competencies, industrial relationship and so on.

I. COMMENTS, IF ANY

Please freely add comments you deem useful for the improvement of the global training system in the Country, with special concern for the job competencies related to the electronics and supporting industries.

ANNEX E

JOB DESCRIPTIONS FOR SUB-OPTION 1.a2

ANNEX E

JOB DESCRIPTIONS FOR SUB-OPTION 1.a2

Hereinafter are given exibits of three job descriptions related to sub-option 1.a2 of the Proposals (Consultancy services: key personnel team of advisors to the National Training Agency), namely:

1. Human Resources Development Expert
2. Industrial Training Specialist
3. Job analyst/Researcher

Format and contents of the job descriptions are meant for the selection of candidates and as a tentative definition of their role and duties within the envisaged National Training Agency (NTA).

Please note that each of the three positions might be covered by only one person for the full period or by two or even more persons , working together or in succession to one another. The limitation being the amount of man/months alloted.

If, for example 2 man/years are envisaged, there may be an expert for two years or two for one year or other combinations.

Age, title and qualifications are not relevant (a degree level of education is in any case desirable, if not a standard).

What is instead of great importance is a wide spectrum of expertise in HRD and a deep knowledge and relevant experience in the specific field of the candidate's envisaged duties.

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

The format used is the following:

- Post title
- Duty station
- Duration
- Language
- Essential Qualifications (for roster search)
- Purpcse of the job
- Background information
- Main duties
- Notes

1. HUMAN RESOURCES DEVELOPMENT EXPERT

. POST TITLE:

Human Resources Development Consultant or Advisor

. DUTY STATION:

Malta, within the organisational framework of the National Training Agency (NTA) - Employment Training Corporation - Ministry of Social Policy

. DURATION:

One year, with possibility of extension.

. LANGUAGE: English

. ESSENTIAL 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
- Training of personnel

. PURPOSE OF THE JOB:

To assist the NTA in developing and implementing a programme for the introduction and improvement of systematic and cost-effective methods, techniques and tools in the field of human resources development throughout all the work organisations of the country.

. BACKGROUND INFORMATION:

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

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

From the outcomes of the survey, it appears that, in

most of the companies visited, the full system of personnel management and development, from manpower planning to the rewarding and motivation system, from job grading to performance appraisal, from career planning to in-service training and so on, do really need innovation in methods, techniques and tools.

The newly created NTA is committed to devise and implement a programme to diffuse among public and private companies a "systematic" and professional way to look after the "human factor" which is becoming more and more a strategic lever for economic success.

As it concerns specially HRD systems, the programme will consist of three kinds of activities:

a **Modelling:** i.e. 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.

For the purpose, it is highly advisable that the candidate to the post disposes of a vast array of documentation, exemplary applications, formats, exibits and the like.

b **Consultancy:** i.e. direct advisory services to companies for the creation or improvement of their HRD system.

c **Training:** i.e. seminars and workhops for the spreading of HRD methods and techniques.

. MAIN DUTIES:

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

- Select, develop and/or collate samples of general HRD models, policies, procedures, forms, to choose from or to show to companies as a reference material, and regarding particularly:

  - 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.
  - Organisation forms of skill and performance up-grading, such as: job rotation, job enlargment, job enrichment, assignment,

attachment,research and study work, study tours etc.
- Individual career and professional development planning

- Provide advisory services to companies for the introduction of HRD methods, practices and tools

- Prepare and organise seminars and workshops for the diffusion and cross - fertilisation of HRD methods, practices and tools

- Train Maltese counterpart personnel, involving them as much as possible in all programmes

. NOTE:

It is a valuable asset if the expert is also knowledgeable in computer-based systems of Human Resources Management and Development

2. INDUSTRIAL TRAINING SPECIALIST

. POST TILE:

Industrial Training Consultant

. DUTY STATION:

Malta, within the organisational framework work of the National Training Agency (NTA) - Employment Training Corporation - Ministry of Social Policy

. DURATION:

One year, with possibility of extension.

. LANGUAGE: English

. ESSENTIAL QUALIFICATIONS:

Industrial training consultant with extensive experience in research, development and implementation of training schemes in the field of industrial training.

The following sets of competences are of particular relevance:

- Instructional design or curriculum development methods & techniques
- Competence - based methods of training
- Acquaintance with vocational qualifications classification and assessment systems
- On-the-job training methods, planning, techniques and resources
- Methods and procedures regarding "Organisational" forms of skill up-grading, such as: job rotation, job enlargement, job enrichment, assignments, attachment, secondment, research and study work, study tours etc.
- In -service training organisational structure, policies, methods aids and training skill competences.

. PURPOSE OF THE JOB:

To assist the NTA in introducing and developing systematic and cost-effective in-service training within the work organisations, and in setting-up an

external service of industrial training where and when in-service training is not practicable.

. BACKGROUND INFORMATION:

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

On Government request, a UNIDO team of advisors has carried out a survey on the training needs and on the training delivery system with the committment to suggest options for the improvement of technical training for high-tech industries.

From the outcome of the survey, it appears that systematic and professionally staffed industrial training is, excluding a few exceptions, in need of strong innovation. Practices like training needs assessment and diagnois, instructional design, media utilisation, training of instuctors, assessment of results etc. are to be more widely spread.

Obviously the organisation, policies, procedures and staff competences of a well-geared in-service training system is also a target for improvement.

The newly created NTA is committed to introduce or up-grade in-service training system where possible and develop an external system, public and private, of industrial training to serve the economic needs of the country in terms of workforce qualification.

The NTA will follow for the purpose the following lines of intervention:

- Research and development of industrial training methods, aids and techniques.

- Advisory services to companies for establishing or up-grading in-service training systems and for designing training programmes.

- Design and implementation of external industrial training courses, where and when necessary.

- Training of trainers courses and seminars at a later stage.

- Setting-up of a resource centre for the self-learning mode of training for workers and instructors.

. MAIN DUTIES:

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

- Advise on cost - effective methods, techniques, aids and staff competences needed in industrial training

- Provide direct advisory services to companies for establishing or up-grading in-service training systems and, where requested, for helping in designing training schemes for their own personnel.

- Supervise the design of external industrial training courses provided by the NTA.

- Provide advisory assistance to the technical education staff in training methods and, especially, in curriculum development methods.

- Advise on the setting-up of the training resource centre in terms of learning material and documentation and in tutoring methods and procedures.

- Train Maltese counterpart personnel, involving them as much as possible in all ativities.

. NOTE:

It is an asset if the expert is also knowlegeable in computer-based training (CBT).

3. JOB ANALYST/RESEARCHER

. POST TITLE:

Training Needs Analyst

. DUTY STATION:

Malta, within the organisational framework work of the National Training Agency (NTA) - Employment Training Corporation - Ministry of Social Policy

. DURATION:

One year, with possibility of extension.

. LANGUAGE: English

. ESSENTIAL QUALIFICATIONS:

Expert with great expertise and extensive experience in vocational and industrial training needs analysis. It is a must, the knowledge and field experience of the National Vocational Qualifications (NVQ) system, presently being developed in England, Wales and North Ireland because the NVQ system will a main reference for its work.

The following sets of competences are of particular relevance for the job:

- Competence-based vocational and industrial training methods

- Training needs analysis and diagnosis techniques and tools

- Vocational qualifications classification and assessment, with special reference to the NVQ guidelines set by the National Council for Vocational Qualifications (NCVQ) in U.K.

- Labour market research methods, techniques and tools.

- Acquaintance with the latest technologies having a substantial impact on the skills of the workforce.

PURPOSES OF THE JOB:

1. To assist the NTA in setting-up a permanent "observatory on the labour market and on

technological innovation"

2. To adapt to the Malta environment the NVQ experience.

. BACKGROUND INFORMATION:

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

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

From the outcome of the survey, it appears that there is a strong need to redirect vocational training towards a more up-dated and cost effective system of qualification in line with the labour market demand and, also, to innovate methods and competences of in-science training system, which, as everywhere, must have its basement on good methods and practices of job analysis and training needs analysis and diagnosis.

The newly created NTA is committed to redirect vocational and industrial training towards the real and pressing needs of employement, individuals and the economy as a whole.

That is why, among the lines of action NTA is undertaking, the establishment of a well-geared system of permanent and effective analysis and diagnosis of training needs is of utmost importance, starting with specifications of specific skill profiles to which to refer for providing organised training.

. MAIN DUTIES:

The expert will be attached to the NTA team of work and will be expected to:

- Assist NTA in setting-up a permanent observatory on the labour market and on technological innovation in the light of defining and forecasting the workforce skills requirements . The above, in the perspective of providing the right training for the right needs at the right time.

- Develop a dynamic system of vocational qualification adapted to the Maltese situation and borrowing fron the UK experience of the NCVQ.

- Provide adviscry services to work organisations on methods, techniques and tools for job analysis, training needs analysis and diagnosis.

- Train Maltese counterpart personnel, getting them involved as mush as possible in all activities.

. NOTE:

Knowledge and experience in computerised systems of data gathering and processing is an asset.

ANNEX F

INDUSTRIAL TRAINING METHODOLOGY GUIDELINES

Introduction:

This document provides some basic hints and suggestions regarding good training methods

It does not intend to be "the model" but only a reference for practicioners who still need an overall and simplified picture of the "state of the art" in the provision of cost-effective training.

The work is organized as follows:

1. EDUCATION AND TRAINING: THE DIFFERENCES

The conventional "school model" of providing instruction, is the one that everybody know quite well by personal experience. It is also a pattern of instruction widely applied also in many adult training systems

Many problems come to industrial training from the adoption of poorly cost-effective methods derived from the crystalized old way of schooling, which, by the way, has no reasons, where this happens to be the case, to remain obsolete.

But first of all, there are differences, more or less objective ones, between education and training, and, before dealing with industrial training we would better clarify this divide in order also to understand the less clear-cut divide, largely not justified, between technical education and industrial training.

2. INDUSTRIAL TRAINING AS A PRODUCTION SYSTEM

The most crucial innovation in a training system is its conversion into a "factory" for the production of the right competences for work. This applies to industrial as well as vocational training.

This point is illustrated by comparing a training system to an industrial production system, geared towards the delivery of tangible products or results; in the training process of productions the results are learning outcomes and standards of job performance, in only one word job competences.

3. THE SYSTEMS APPROACH

An understanding of the body of knowledge of modern training cannot be substantially grasped without going back to the introduction of the systems approach into the practices of instructional design.

The systems approach was first applied in the Fifties in the engineering sector, precisely in high-tech projects. This method was then transferred to a new field of application, i.e. training design. Focus was thus placed on systematic planning, precise definition of objectives, control of results, efficiency, effectiveness and productivity, - the essence of the new way of producing training services.

4. TRAINING TECHNOLOGY: AN INTERESTING PERSPECTIVE TO DEAL WITH TRAINING METHODOLOGY

The aim here is to view training methods from a "technological" perspective, and to dispel, at the same time, the illusion that sophisticated training media by themselves, might be the magic solution to all training problems.

We shall, in fact, see that training technology is not simply software and hardware, modern and useful as they may be, but it is a well-geared system made up of methodology, modern media (tools amongst tools) and a "professional" organisation, where staff competences are the most valuable asset.

5 SUGGESTIONS AND IDEAS FROM FOUR DECADES OF ADULT EDUCATION AND LEARNING PSYCHOLOGY STUDIES AND EXPERIENCES

The aim of this section is to simply "add" to the picture of a good training system, without claiming at a scientific synthesis.

6. INDUSTRIAL AND VOCATIONAL TRAINING: STRATEGIC GUIDELINES

An outline is provided of the guiding principles which should be the reference for providing cost-effective, pertinent to employment and viable industrial training.

1. EDUCATION AND TRAINING: THE DIFFERENCES

1. EDUCATION AND TRAINING: THE DIFFERENCES

The poles of reference considered are **academic education** and **industrial training.**

Technical training and vocational training fall between and participate in the features of one and the other, according to the bias given to the instructional methods and practices.

We all know what school education is; we shall therefore review industrial training.

Industrial training is a form of instruction provided to workers or potential workers with the aim to equip them with the competences, skills/attitudes/knowledge, required to them to properly perform the roles and duties entrusted to them by a work organisation.

In other words industrial training is an investement on human resources to qualify them for job performance according to expectations of employment or professional bodies

Industrial training basically differs from school education in that, in both cases, both the specific requestor and the destinee are different. In the case of industrial training, the counterpart requesting the training services is the management or the supposed employer of work organisations and the destinees are workers or people seeking a job; in the case of education, a counterpart is Society in general and the other citizens in general.

This entails drawing a series of differentiations which may be summarised as follows:

a) **Different aims**

Training is an investment on human resources for precise economic or organisational purposes and the decision takers on programmes to be implemented are managers , or the supposed ones, only interested to solve very specific operational problems.

On the other side, programmes of education are decided by representatives of the society, possibly within the ministry of education, and are meant basically to the development of human and cultural requirements of citizens and society.

b) **Different economic criteria**

The education system does not have to respect precise economic criteria. Times and resources are budgeted with loose reference to what is produced.

Industrial training, instead, is a tool for improving the productive value of the human resources, and times, resources and results obey the same economic criteria of organisations producing goods or delivering services. The rule is to get the maximum yield in the shortest period of time.

c) **Effectiveness is a must in industrial training**

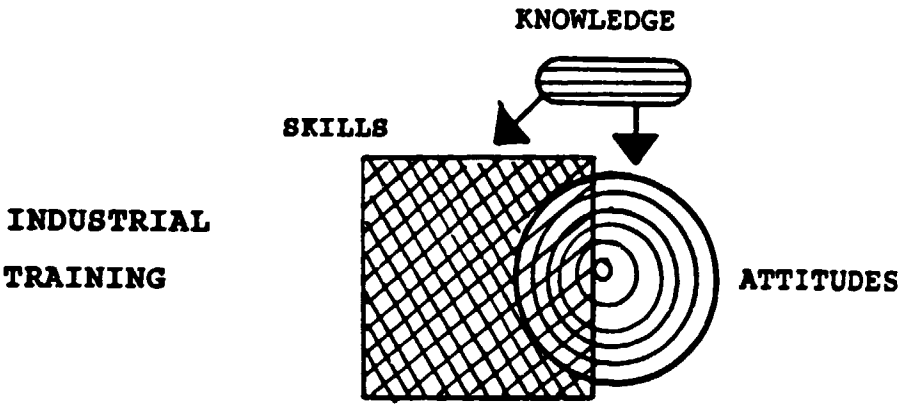
The logics of economics and productivity of work organisations demand clearly defined and tangible results from industrial training practices . This consequently entails - much more than in the educational system - a precise definition of objectives, systematic design of what should be delivered and a strict assessment of results.

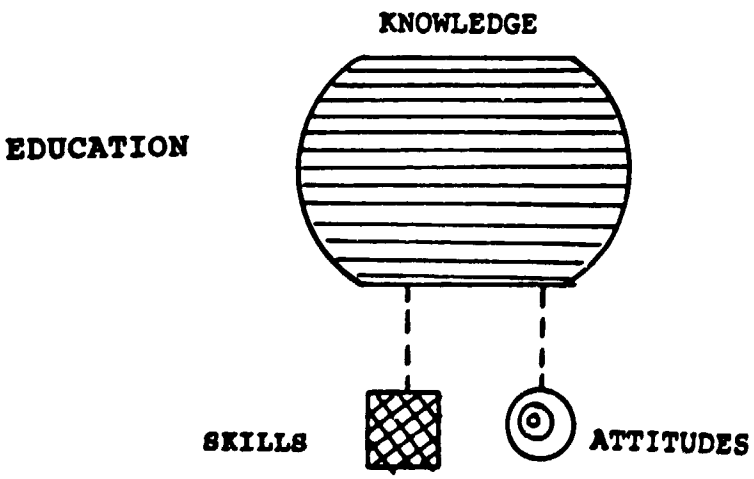
d) **Industrial training is engineered upon operational skills and attitudes, instead within the framework of education,"knowledge" is the overwhelming aim**

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

Moreover, in training , the knowledge to be transferred is the 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/attitudes on one side and of knowledge on the other, the following diagram may better than words illustrate the concept.





e) **Training presupposes the student's success**

Th 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 gain 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 occurs in education, but on the basis of the 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 mis-match between objectives and results, it is not the trainee's fault, but rather it is the trainer or the system which have not functioned properly.

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

At this point, a key-question emerges: Must the methods be different for education and industrial training ?

In theory, it must not be different, or at least, not in a significant manner. 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. Usually in industrial training, there is an "engineering-oriented" kind of approach, carefully channeled to secure specific professional results, 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 advanced and cost-effective way of production, is preferred to the term "training methodogy", 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 entail opportunities, constraints and prescriptions that the educational system has not. 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. All this add to objective differences between training and education on the possible ways of delivering instruction.

2. INDUSTRIAL TRAINING AS A PRODUCTION SYSTEM

2. INDUSTRIAL TRAINING AS A PRODUCTION SYSTEM

The concept of training technology today evidences the magnitude of change that has taken place and is taking place in training in general.

The training process has, in fact, been integrated into technolgical development and features the same criteria of efficiency, effectiveness, productivity and control, typical of industrial production.

A training system is, in practice, a "learning factory" for the production of skills/competences of workers.

The table on the following page sketches the transformation process which takes place in a training system.

* The **input** of the " cycle" are the competences already possessed by the trainees upon entry (knowledge, skills, attitudes, values, experience and obviously 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:

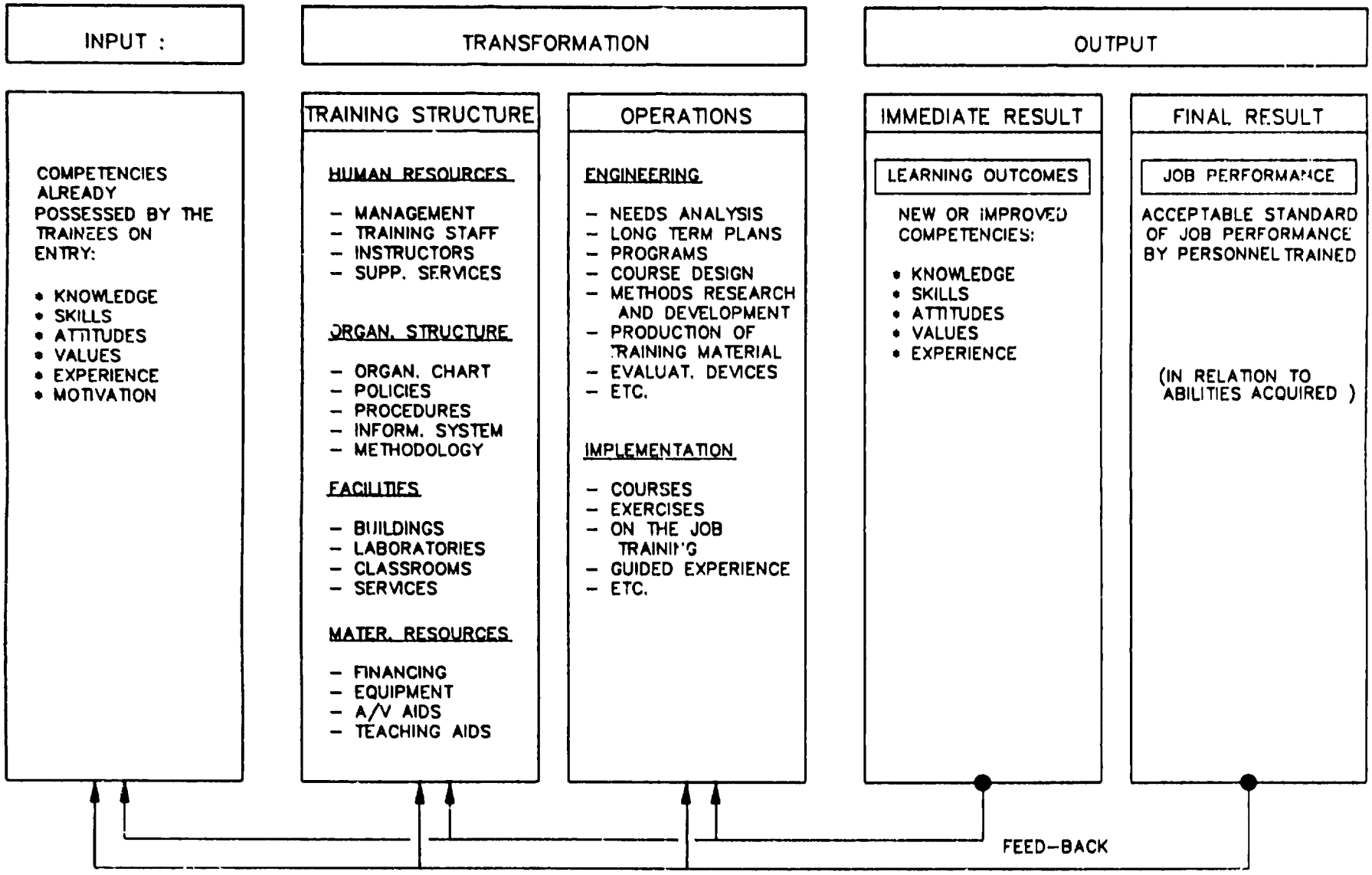
  - **human resources**: management, training staff, instructors etc
  - an **organisation structure**: organisation chart, policies, procedures, information system, methodology;
  - **facilities**: buildings, laboratories, classrooms and services;
  - **material resources**: financing, equipment, audiovisual and teaching aids.

- And through **Training Operations** which are distinguished in:

  - **engineering activities**: needs analysis, long-term plans, programs, course design, methods research and development, production of training material, evaluation devices etc.
  - and **training implementation operations**, such as courses, seminars, courses, exercises, on-the-job training, guided experience, etc.

The control of the immediate results, that is, the learning results, alongside the control of the final results, standard job performance, provides, thanks to feedback from assessment measures, the self-regulation of the system.

TRAINING AS A PRODUCTION SYSTEM



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3. THE SYSTEMS APPROACH

3. THE SYSTEMS APPROACH

The systems approach was first applied in the Fifties in the advanced engineering for dealing with extremely complex design and development problems involved in production projects , 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 explained 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 then:

* problem analysis;
* production goals
* design and planning
* implementation
* control of results
* corrective feedback.

The matrix of this method is not new. The foundations of this model may in fact be traced back to the research method of experimental science, notably to Galileo's inductive-experimental model,that is:

* analysis of phenomena;
* generalisation 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.

In training, the basic features of the systems approach applied to instructional design may be outlined as follows:

* needs analysis
* training design
* development
* implementation
* control (evaluation).

The **Need Analysis** implies an analysis of training needs within a given work organisation. The Need 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, budget necessary 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 logistic organisation 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 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.

In the following pages a detailed example of the "procedure" is shown. It must be clear however that instructional design do not, as we shall have the opportunity to stress later on, actually follow such a linear and "procedural" approach. Nonetheless, this is possibly the best starting point for explaining the system approach in instructional design.

INPUT-OPERATIONS-OUTPUT OF EACH PHASE

1. 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.	- 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.	- 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)

DESIGN

INPUT	OPERATIONS	OUTPUT
OUTPUT OF ANALYSIS PHASE	- 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 -	<u>PROGRAM</u> - TYPE AND NUMBER OF TRAINING ACTIONS - PROGRAMS (CONTENTS) - OBJECTIVES - METHODS - MEANS - TEACHING AIDS (TEXTS, EXERCISES ETC.) TO USE ..... <u>REALIZATION PLAN</u> - TIME DISTRIBUTION - EMPLOYMENT OF HUMAN RESOURCES - TRAINING MATERIALL PRODUCTION PLAN - LOGISTIC PLAN - BUDGET - .....

DEVELOPMENT

INPUT	OPERATIONS	OUTPUT
OUTPUT ..OF DESIGN PHASE	- 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 -	PRINTED MATERIAL - 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 .....

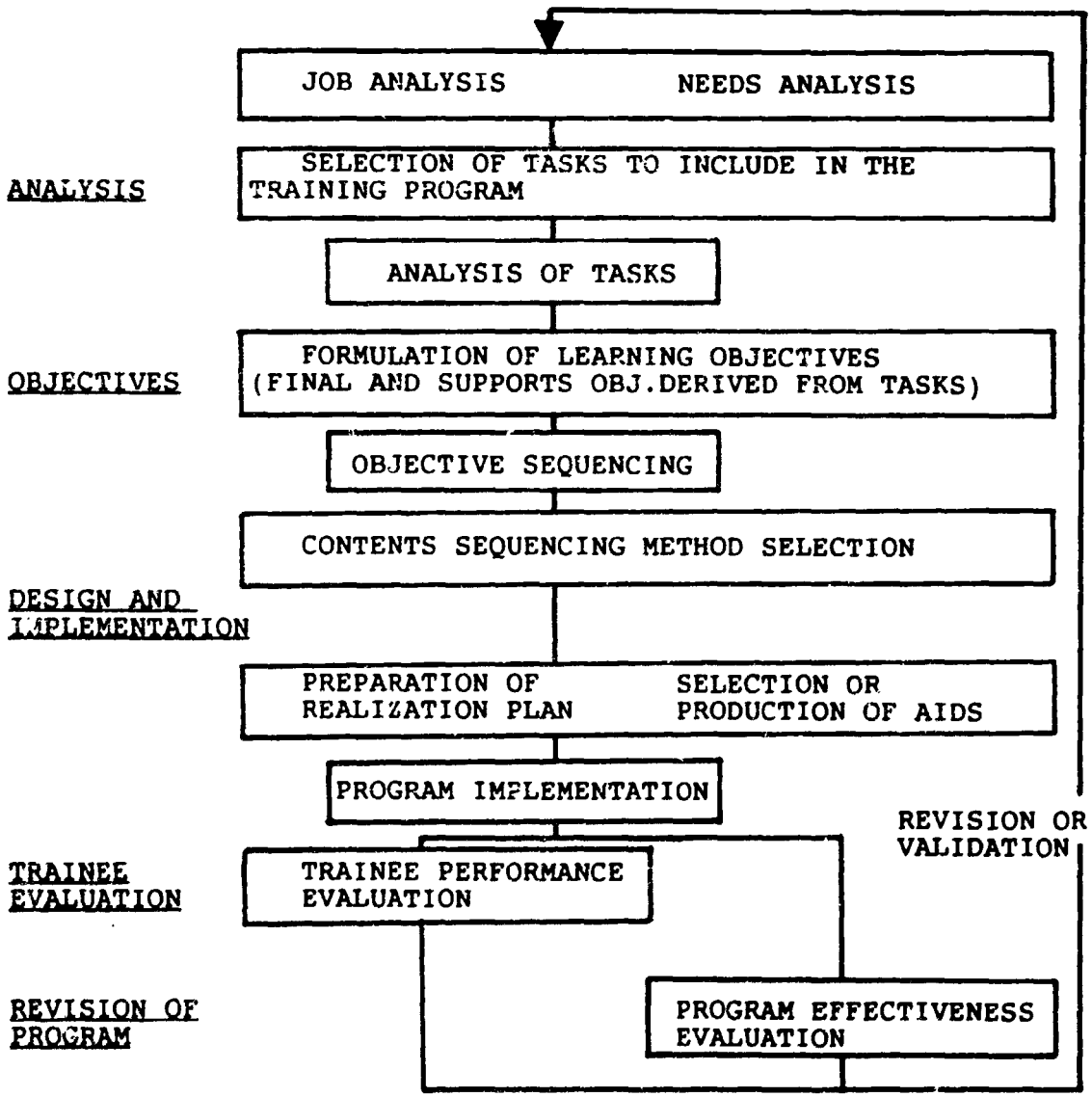
IMPLEMENTATION

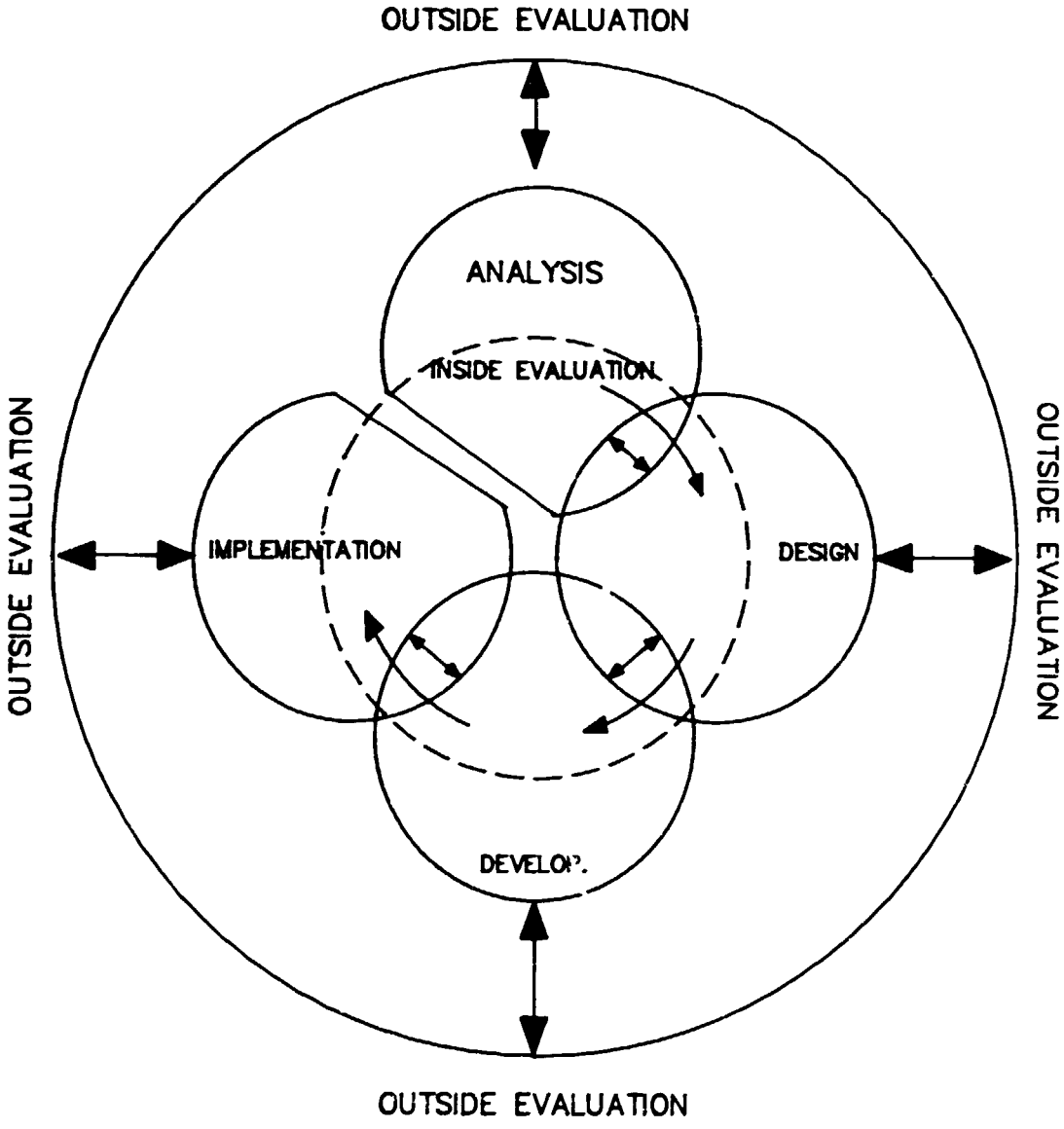
INPUT	OPERATIONS	OUTPUT
- TEACHERS - STUDENTS - PROGRAMS - TRAINING MATERIAL - TRAINING FACILITIES, EQUIPMENT MEANS - DEVELOPMENT MODALITIES -	- TRAINING CYCLE - COURSE MODULES - TRAINING UNITS - SEMINARS - ON THE JOB TRAINING - EXTERNAL COURSES - SELF TRAINING - SIMULATION - ..... - ..... - ASSESSMENT OF LEARNING RESULTS	- WORKERS WITH ENVISAGED COMPETENCIES . KNOWLEDGE . SKILLS . ATTITUDES - LEARNING EVALUATION DOCUMENTS

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 under the form of graphs in technical literature. They all fall between two poles: the linear step-by-step one and the circular iterative one. Following are examples of both patterns.





CYCLIC REPRESENTATION THAT ACCENTUATES INTERACTION AND INTERDEPENDENCE

Here the training phases are interdependent and do not follow a linear pattern. The diagram also shows that the **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 organisation perspective, i.e. job performance assessment, evaluation of benefits etc.).

Graphics, no matter how complex, do not fully illustrate the characteristics and the great potentiality of the systems approach to instructional design.

Indeed, Romiszowski (1981) hightlights very well the limitations of these diagrams, especially the 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 procedure 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 more than the application of precise rules. This highlights the creative aspect of the **Systems Approach** and re-dimensions 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 prescription 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 organisation.- A correct approach imposes that courses be geared towards the competences needed by and within the Client's organisation.

The importance of training needs analysis and the evaluation of training results are consequently of vital importance in training methodology; these aspects liaise training with work organisation, i.e. with its "raison d'etre" .

Training methodology thus emerges from its "pedagogical" shell and merges with organisational theories and practices, through the bridge of 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 integrated part of human resources management and development practices of a given work environment.

4. TRAINING TECHNOLOGY: AN INTERESTING PERSPECTIVE TO DEAL WITH TRAINING METHODOLOGY

Introduction

When speaking of advanced technology in the sphere of training or education, one immediately think of computer and multimedia applications.

No doubt that the media represent the most noticeable part of modern or advanced instruction technology, but to simply equate media with technology may be a misleading viewpoint. It overemphasize the role of tools and products in the concept of technology.

Any technology in fact is more than its tools, it is also, if not principally, the way (the method and process) of producing something and the organization set-up for the production and the proper utilization of its own products.

The media, or, to call them in different terms, the hardware and the software, are only instrumental for an effective production of learning outcomes. To get this result you need also an instructional methodology, competent staff, a logistic set-up and so on.

To put it briefly, education technology or training technology means, in fact, hardware, software, process and organization all woven into one. And if we wish this technology to be advanced, then all four of these components must be advanced.

It is important here to make this point because it is easy to fall into the illusion that to "modernize" a training center, all that is necessary is to provide it with some sophisticated hardware and buy some software packages, selecting from among the best the market has to offer.

But let's suppose, for example, to fail in matching the training provided with the real training needs of learners (just a piece of what a

training methodology means) that a full scheme of training becomes useless if not detrimental.

Or, to give another example, a computer based course may come to an end because nobody is able to service a simple piece of hardware or to properly run a software program (an organization failure).

It is therefore important to properly fit the media in a suitable instructional context. Media alone do not mean advanced training technology.

But what is then .. a training technology and, particularly, and advanced one?

Training technology: towards a definition

The term 'technology' whether coupled with education, or instruction or training, has been around now for a few decades. However, what we mean by instruction, education or training technology is not always clear.

Already in 1964, A. Lumsdaine (Lumsdaine, 1964) observed that there were two distinct meanings for "Training Technology":

1. "Training Technology: essentially a hardware approach. It stresses the importance of **training aids** such as projectors, teaching machines, language laboratories, television, simulators, etc. The origin of this particular approach lies in the application of physical science to the problem of teaching".

2. "Training Technology:: essentially a software approach. It stresses the importance of **learning aids** such as programmed instruction, "new" maths, individual work-sheets etc. The origin of this particular approach lies in the application of psychology to the problem of learning".

I. Davies (Davies I.K., 1973) who recalls the two definitions put forward by Lumsdaine, suitably combines them to form a third:

3. "Training Technology: This combines the hardware and software approaches of the other two. It takes a systematic and integrated approach, and applies behavioral science to the problems of both learning and teaching".

In fact Davies goes beyond the concept of "resources-based" technology, i.e. as media – whether hard or soft – and introduces the concept of technology as process, attaching it (as can be seen) to a systematic vision of training and the application of science (which for Davies is "behavioral science"), as well as to the problems of learning and teaching.

More explicitly, A. Romiszowski (Romizowski 1981), after observing how the "turning point" in the modernization of the education and training systems came with the adoption, in the late 1950's, of the same productive criteria as those which were already widely validated in avant-garde industries, –efficiency, effectiveness, control, the "systems approach, etc."– faces the problem of the meaning of education technology, defining technology first of all as:

- "The creative application of science to industrial (or any practical) purposes".

For Romiszowski then technology is a process:

- "The definition quoted above is a process definition: it is something that people do by applying what they know, and they do it creatively".

And so, for Romiszowski, technology is applied science, and instruction technology is science applied to the problems of instruction. Having established this, it is possible to retrieve all the dynamic and generating qualities of technology and, above all, its methodological connotation.

But what is this science which generates and determines instruction technology?

The answer is not easy. There is not a defined instructional science, there is instead a rich body of theories, models, principles, studies and experiences, which has been gathering strength since the Fifties in particular. To this body of knowledge, learning psychology, behavioral psychology, pedagogy, the cybernetics and other study branches have all contributed.

We will mention here, by way of example, some instruction models such a programmed instruction, "Mathetics"', and Mastery Learning; schools of thought such as behaviorism, Gestalt, the cognitive approach, motivation theories, and innovative methods such as the definition of learning objectives in a behavioral form, and the

"systems approach" for instruction design; then important principles such as the subordination of teaching in favour of learning, or the active involvement of learners; then the development of the media; and the contribution of school Heads like Skinner, Bruner, Gagné, Bloom, Landa, Maslow, Ausubel, Gilbert, Rogers, etc.

While, on the one hand, such a theoretical body of knowledge appears composite, often contradictory, and certainly a far cry from amenable systemizations, –on the other hand, it exists and is rich in principles and suggestions for those working in the field of training and who wish to carry out their instructional job more efficiently and successfully.

This is even more true in industrial training, where instruction is more concrete, the criteria of efficiency, productivity and control are stricter and success must be demonstrated. The general approach here is systematic, engineering-like and precisely oriented to practical purposes. That is why wherever industrial training is carried out in the proper way, the "method" of doing it may be varied but always "professional". And, all in all, the methods and techniques are becoming increasingly similar. Thus practices like the definition of the competencies profile to produce, the analysis of training needs, the precise definition of learning objectives and of control devices, a systematic design of instructional events, the selection of appropriate instruction aids and so on, are not only common to most training designers but even widely comparable if not easily transferable to one context to another, and this is a sign that the training "methodologies" are mature, at least for practical use.

Coming back to the question of a definition of training technology, this is above all a method of doing things, a way of producing. As a matter of fact training technology is a process for producing job competencies through systematic instruction. The media, hardware and software, are merely parts of this production process; they are not technology tout court.

Moreover, in any real-life situation, it is not enough to possess the method, and the hardware and software suited to the task; it is also necessary to have a suitable organization in order to reach one's aims, and by the chosen road. In a training context, the organizational feature most needed, is a suitable level of professional competence of the training staff.

We now have all the elements for defining training technology:

"Training technology is the application of a specific body of knowledge and practices (science) for solving problems related to the qualification of human resources for occupational purposes, through systematic instructional activities.

It is essentially a methodology for the creation and the implementation of training interventions (a process) and its basic function is to improve the efficiency and results of learning and teaching efforts.

This methodology avails itself of technical instruments: teaching aids or hardware, such as blackboards or computers, and other didactic material: learning aids or software, such as printed texts or computer-based programmes.

Finally, as a condition for its effectiveness, a training technology requires also an appropriate organizational context, especially in terms of professional competencies of the training staff."

Now, when is it that one training technology is more advanced than another?

The answer is not easy, because there are here at least two meanings of "more advanced". It may be in one case "more efficient and more effective" and on the other more modern and, at times, also more sophisticated.

When the process aspect of training is concerned, the criterion of efficiency/effectiveness prevails: the more advanced a training technology is the more "productive" is in terms of learning results. When

instead the hardware and software aspects are referred to, the criterion of up-to-dateness prevails: a computer-based lesson looks much more advanced than a lesson with the help of chalk and blackboard.

It is up to the training staff to subordinate up-to-dateness to efficiency and effectiveness. A CAI program or an interactive videodisc will be used if and only when they make the learning and teaching process more efficient and effective. This is not a real problem for "professionally" qualified staff, since they have only to choose from a larger and potentially more powerful set of tools and techniques.

Following is a graphical representation of what we have said about the meaning of training technology.

Note that the process component has been subdivided into its "production" aspect (Engineering) and its implementation moment, since the two phases even if interwound may have different times, and, in any case, their own specific features as regards resources, methods and competencies.

A word of warning: "Advanced" does not necessarily means "better"; and "traditional" is not necessarily to be avoided. Certainly, advanced technology has a greater potentiality, provided, obviously, there is the ability to exploit it correctly.

TRAINING TECHNOLOGY

TECHNOLOGY AS / LEVEL	A PROCESS (METHODOLOGY)		A PRODUCT OR MEDIA (RESOURCE BASED)		AN ORGANISATIONAL SET-UP (SERVICE)
	ENGINEERING OR DESIGN	IMPLEMENTATION (CLASSROOM)	HARDWARE (TEACHING AIDS)	SOFTWARE (LEARNING AIDS)	
TRADITIONAL	• Programmes based on subject matter • Planning within given times • Objectives not clearly defined •	• Teacher centered instruction • One-way communication • Final exams only •	• Blackboard • Flip chart • Cut away pieces • Real objects •	• Printed text • Teaching guides • Photocopies • Exercises •	• Discipline administration • Management of activities • School model structure & organisation • .....
ADVANCED	• Competency based programmes • Training need analysis • Precise objective definition • Systematic design • Control of results •	• Learner centered instruction • Multiple-way communication • Active instructional methods • Use of motivation • Use of media •	• Overhead projector • Slide projector • Cassette recorder • Videotape player • Film projector • Pilot plant • Analogical simulator •	• Transparencies • Slides • Films • Tapes • Programmed instruction texts • Simulation games • Active exercises •	• Methods pre-eminence • Professional competencies in needs Analysis, training design,learning assessment etc. • Integration with HRD • Integration with the "Client" system (Work Organisation)
+ COMPUTER AIDED	• Computer assisted design • CAI programmes • Computer Managed Instruction •	• Instruction integrated with computer based programmes • Individualised instruction • Computer Assisted Learning	• Mainframe, mini & personal computer • Videobeam • Interactive videodisc reader • digital simulator •	• CAI programmes • CMI software • Digital simulator software • Interactive video disc •	• Competencies in CBT • Competencies in informatics • Servicing of hardware and software • .....

5. SUGGESTIONS AND IDEAS FROM FOUR DECADES OF ADULT EDUCATION AND LEARNING PSYCHOLOGY STUDIES AND EXPERIENCES

5. SUGGESTIONS AND IDEAS FROM FOUR DECADES OF ADULT EDUCATION AND LEARNING PSYCHOLOGY STUDIES AND EXPERIENCES

We have highlighted the impact of the "Systems Approach" in the development of good practices of training. Contributions to training methodology have also come from studies and experiences on many fields such as communication, motivation, organisational theories, modern media, perception ,cybernetics, brain physiology, artificial intelligence, adult education, and, above all, learning psychology.

An overview of basic and widely accepted principles coming especially from adult education practices and learning psychology studies is given hereinafter without any claim to exhaustive and/or scientific treatment. Besides the field is still widely open for debates and innovation.

The Subordination of teaching to learning:

The function of training, and instruction in general, is to attain learning results. Without learning even the most wonderful teaching performance is useless.

The centre of an instructional system must be the learner and the end results of the system must be measured in terms of learning outcomes. Otherwise the system is, at the best, useless.

The teacher must subordinate teaching to learning. He must direct his endeavours on the learners side, pay attention to the process of comprehension and learning, to the group interaction, to the attainment of learning objectives by all learners.

In the development of instructional methodology, this has been a sort of "Copernican Revolution" since the conventional school system was fundamentally magistrocentred. Attention was paid more to the text and to the teaching rather than to the learning process. Communication was essentially one-way, that is from the teacher to the student, and students were simply considered as "containers" to be filled with knowledge and were not allowed to have an active role in their own process of learning.

Classification of Learning Objectives:

To know the component-parts of an engine is altogether different from the ability to disassemble and re-assemble it or to have an interest for engines mechanics.

In the first case, knowledge is present; in the second, ability is evident and, in the third case, a positive attitude.

To instruct somebody in one or the other or in all of them are teaching/learning objectives of different nature and surely the teaching and learning tasks differ from one another.

Moreover,the component-parts of an engine, as an objective of knowledge, might be taught/learned at various levels of competence and difficulty. We may be satisfied if the learner lists all the elements, or we want him to comprehend also the function of every component or even to distinguish between component characteristics of similar engines.

In this case as well, there are different teaching and learning obectives; they are different in level of competency to acquire and in level of difficulty of the teaching as well as the learning task.

It is easy to understand how the teaching objectives, according to type or level, entail different modes of design and delivery of instruction.

Educators have always posed the question of what to teach and for what purposes. Yet, there has always been a substantial divergence when comparing the results of nominally identical programmes. In fact, there has always been an great problem related to consent, coherence, rigour and precision in defining teaching/learning objectives.

B.Bloom and his collaborators, starting with the problem of school examinations comparability and the intention of classifying and standardising examination tests, developed a very useful instrument that had a marked influence on instructional methodology : a taxonomy of learning objectives. (Taxonomy simply means a classification made according to a certain order-principle.)

Bloom and his collaborators first of all subdivided objectives into three main fields:

- the **cognitive area** , commonly known as knowledge;
- the **affective area** , that includes behaviour, feelings, attitudes and values;
- and the **psychomotor area** that refers to practical abilities.

In 1956, they drew up the taxonomy of objectives of the cognitive area which was, of preheminent concern in the contenxt where they were working: that is , the educational system.

In 1974, Ktathwohl, Bloom and other colleagues produced the same in the affective area. In the meantime, and lately, a number of taxonomy proposals were developed, some of which also apply to the psychomotor area.

There has also been a mushrooming of studies on the application of taxonomy on specific subjects, together with a proliferation of comments, ideas and practical suggestions and, above all, interesting studies and experiences that aimed at translating these objectives into specific and operative terms.

The structure of Bloom's taxonomy for the cognitive area is based on six main categories, which are subdivided into sub-categories. The six main categories are:

1. **Knowledge:**
consists in re-calling to the memory information previously assimilated, such as facts, concepts or theories. All that is required is a mnemonic performance of a reproductive type.

2. **Understanding:**
is defined as the ability to understand, i.e. to personally "incorporate" information so that one is able to express this same information in other words or in another language, or through a simple elaboration.

3. **Application:**
is the ability to exploit abstract representations on specific tasks. This may refer to the application of rules, methods, concepts, principles and theories.

4. **Analysis:**
is the ability to breakdown a "whole" into its component parts and to understand the structure and the relationships between the parts.

5. **Synthesis:**
is the ability to construct a "whole", by starting from distinct elements. It is not the reverse of analysis, but, instead it is the ability to create something new, according to a principle of aggregation.

6. **Evaluation:**
is the ability to express qualitative or quantitative judgements on a specific subject either by adopting inside criteria, that is, criteria which are coherent with the nature or the organisation related to the subject ; or outside criteria, that is criteria relevant to the subject, but belonging to another system of values (for example, to evaluate a literary work from the moral point of view.)

This simple exposition of Bloom's taxonomy enables us to stress the difference that may exist for the same programme-contents when these are dealt with at one level, rather than another.

In addition, it may be noted how the taxonomy is ordered according to criteria of increasing complexity and growing abstraction, and consequently according to increasing levels of competences. Implicit here too, - the authors state -is the criterion based on the hierarchy of learning tasks, according to which, it should not be possible to pass to a higher level until the lower level of

objectives has not been attained. This order of hierarchy has often been criticised. But the idea that learning must be organised in **ascending levels of learning-ability and complexity** is valid and useful.

Another taxonomy that has had great impact in training can be found in the works of R.Gagne',which we can only cite in this paper although it could deserve greater elaboration. Gagne's models is not simply a taxonomy of objectives, but it is also a classification (hierarchy) of learning modes. To each of these, Gagne' coupled favourable conditons for effective learning.

The classification and hierarchisation of learning and training objectives is, to date, a field of research and development that is still very active. New taxonomies emerge; consolidated taxonomies are subject to enrichment or simplifications. Ways and means are studied in order to render, in a practical way, the transformation of the taxonomy categories into specific operative objectives.

At the same time, there is an increasing application of taxonomies, and usually in an eclectic forms,that is, by combining elements from several models or even simplifying the same.

This subject should deserve further treatment. First of all, due to the innovation that it brought about in training methodology, and secondly for the benefits it could bring about in training practices if it were applied on a vaster scale. In fact, it is easy to see how much could be gained in effectiveness, by precisely defining the type and level of learning to be acquired, as the compass of the training programme.

Precise definition of learning objectives:

To know where one wants to get helps attaining the result (effectivesness), and the correct result (pertinence), economy of effort and resources (efficiency).

A basic rule of instructional methodology is the definition of the objectives of a course of instruction in the most precise form.

Taxonomies of learning and training objectives have promoted a leap forward in this direction.

But taxonomies are not sufficient. Even the taxonomy which is best fitted to the subject-matter contents to be transferred only defines the types and the levels of learning. It does not specify the kind of specific learning, amongst the possible ones , which is to be

acquired. A more detailed definition is required that explicits the "specific" objectives of the training content.

This problem has stimulated many studies and research. These have led to techniques that are particulary useful in training practices, the most prehenninent one being the definition of objectives in operative/behavioural terms, which shall be dealt with at a later stage in this paper.

In formulating training objectives, first of all, there must be a distinction according to the level of attainment.For instance , one of the distinctions made in training is between:

* **Scope or aim** of the training intervention/ investment /project;

* **General objectives** of the programme, which may even be subdivided into general sub-objectives or section objectives or module objectives.

* **Specific objectives** of the single instructional unit (lesson, exercise etc), often subdivided into sub-objectives or objectives of the element of knowledge or task to be learnt.

The **aims** of the intervention are those which the client-organisation intends achieving through investment in training.

For example:

To provide salesmen working in the lubricants sector with appropriate technical knowledge on lubricant products, necessary for a more professional relationship with clients, and for a first screening of problems put forward by the clients.

The **general objectives**, which are in cascade with the organisational aims, express what the designer of the programme (or training modules or programme sections) intends attaining in terms of learning results at the end of the programme or module..

For example:

Module 3, Objective 5:
The trainee shall be able to establish the correct SAE grading of lubricant-oil, according to the seasonal temperature, the conditions of use, and the type of engine. (Third level of Bloom's taxonomy: application.)

The **specific objectives**, which derive in cascade from the general objectives, express in behavioural terms that

which the trainee must be able to dc in order to prove his learning, based on the units of instruction.

For example:

> Objectives 3 - 5 - 9:
> Without using notes or conversion tables, the trainees shall be able to convert the competitive firm motor-oil to the equivalent type and grade of his company.
> Ten examples of engine lubricants produced by company A, company B and company C shall be given to the trainee. A correct conversion of 9 out of 10 shall be considered satisfactory.

In the last example, use has been made of the behavioural pattern of tating learning objectives according to the model advocated by R. Mager.

The model is made up of three parts:

1. **The performance** of the trainee to evidence his learning.(In the example, he must make a conversion.)

2. **The conditions**, that is, the limitations and the conditions in which the performance must take place. (In the example, without the aid of conversion tables).

3. **The standard** of performance which is considered acceptable or satisfactory. (In the example, nine correct answers out of ten).

To render the formulation even more precise, a fourth part could be added, i.e. the type of **test** which is to be used to verify learning. (In the example, the participants are given ten examples of lubricant-oil...)

The essential is the formulation of the **performance**. The other parts may be left to the instructor.

This method features a strictly behavioural matrix: since it is not possible to verify/measure learning because it is an interior process of the individual and therefore is not tangible, the external manifestations (behaviour/ actions) of learning are measured, which demostrate that a certain assimilation has taken place.

The greatest limit of the method perhaps lies in the fact that not all the things learnt can be manifested, and even less so in the limited period of time that covers the training activity. This is particularly true of those abilities which take time to mature and especially

transversal skills , i.e. those skills which may be applied (transferred) to different contexts. These are mainly the higher-placed skills/ competences on the taxonomy scales.

Although these limits do exist, this method has been a great jump ahead in the methods and practices for defining learning objectives as precisely as possible.

Continuos and Punctual Assessment of Learning:

Another mainstay of training methodology, and of instruction in general, is the regular assessment of envisaged learning.

Training has the function of bridging a gap in competences, i.e. to provide the missing part of knowledge and/or skills and/or attitudes in the competency profile of a worker.

In order to produce an effective training programme, it is therefore necessary to exactly define what the student must learn (the objectives), taking as a starting-point that what he already possesses, or what he is supposed to possess (prerequisites).

The verification of student's entry -competences and prerequisites that are necessary to successfully attend a given learning programme, is an important operation that is unfortunately very often neglected to the detriment of the effectiveness of the programme.

As regards the assessment of predefined learning results may be undertaken in three forms:

a) **An informal but continuos assessment**, through purposely studied questions, exercises, group-work and sub-group work, performance observation, interpretation of the non-verbal language, attention to messages and behaviour of the students.

b) **Formative evaluation** , which comprises tests during the course of training, specifically drawn up in order to single out possible learning defects and/or teaching defects. These tests are always followed-up by a discussion on the weak points that result,and when necessary, by interventions of an individual or group nature, aimed at learning remedial.
The adoption of this mode of assessment may be completely entrusted to the trainer. It is extremely useful to guide and , if necessary, to

correct the learning and teaching processes.

c) **Summative evaluation** that verifies the student's proficiency i.e. the learning of students at the end of each phase, or of the full learning cycle. It essentially consists in evaluating the trainee's learning performance through through texts, exercises or practiacl exercises to verify whether or not the predefined learning objectives have been attained. Methods, techniques, instruments, times and modes of the testing must be envisaged and defined during the design phase.

It is therefore clear that the verification of the prerequisites and the verification of learning objectives must be coherent and organised in relation to one another, otherwise the trustworthiness of the checking risks being undermined. Further, the contents of instruciton to be transferred must also be exactly that implied by the training objectives and that checked through the tests.

Moreover, also methods, resources and training aids must be approprate for the transfer of competences envisaged in the objectives and in the tests. The need for interdependence among the objectives, prerequisites, contents, verification tests, methods, resources and training aids, once more confirms the usefulness of a systems approach for effective training.

The need of structuring and organising the subject:

Leading training methodologists have emphasized the importance of structuring and organising the contents, for effective learning.

Models of instruction, such as Programmed Instruction, Mathetics, Mastery Learning, as well as all personalised learning systems, and particularly those pertaining to computer based training , all have as a fundamental feature, a highly systematic organisation and sequencing of contents.

Programmed Instruction provides the idea of subdividing the learning contents into many small pieces (steps) which are easily assimilated and assessable.

Mastery Learning postulates the possibility that all the students can attain a satisfactory mastery of the subject - provided they are given necessary time and favourable learning conditions. It insists particularly on the way in which the subject matter to be learnt is presented to the students.
One of the corner-stones of the method is that of carefully

studying the foundations or the bases of each discipline before delivering instruction.

Ausubel, perhaps the most admant supporter of the necessity to organize the subject to be taught as a pre-condition for effective learning of it, suggest the use of "advanced organizers" of the subject for a "meaningful learning". (Advanced organizers are concepts, schemes, guiding stuctures, maps, etc. pre-organizing the subject to be taught and provided upstream the actual delivery of contents)

The Gestalt theorists have emphasized the relevance of the organisation structure of a whole for its "perceptibility" and comprehension. They also have stressed the need of a clear distinction between the whole and its component parts, as well as the need of the "closure" (clear confinement) of a learning task to favour an efficient "appropriation" of the contents.

Landa insists on the advantage, for effective learning, of teaching the fundamental rules, the algorithms of interpretation/solution and the heuristics strategies, which can be extrapolated from, and/or be applicable to a particular discipline.

Both Bruner and Ansubel, although the promoters of "opposite" instructional approaches - the former championing the "learning by discovery" and the latter defending the expositive method where the learners receives everything from outside - nevertheless they express, in more or less the same terms, the advantage of structuring and organising the teaching contents:

* The subject becomes more comprehensible ;
* One learns more rapidly.
* It is more likely that one remembers what one has learnt, even over time.
* One learns more, quantitatively speaking.
* That which has been learnt acts as a model for understanding similar things (easier transfer).
* The gap between elementary knowledge and advanced knowledge is reduced.
* There is less danger of interference.

The Relevance of Different Styles and Paces of Learning:

Not all of us learn in the same way, and not all of us learn the same things at the same pace.

One of the most common defects in the traditional school-system is that of "levelling out" the individual differences, by transferring the same contents to all students with the same method of teaching , and in the same span of time.

Thus,it occurs for instance, that a student with a limited aptitude for abstract concepts is a dunce at Maths simply because the teacher doesn't teach other than by formulae. If the same teacher were also to apply practical demonstrations or were to involve the students in experiments, our "dunce" would possibly achieve more than a satisfactory performance.

Similarly, a student who needs to reflect at length on new knowledge to assimilate it, finds that he may easily loose pace with the others, misses out on important parts, does not manage to catch-up and end up by failing.

The problem of styles and paces is radically solved in the **"Mastery Learning"** method. The basic concept for this instructional model is that all the students may be guided to the mastery of the subject, provided that:

a) Care is taken to transfer the basics of the discipline,before proceeding.

b) All students be given time to assimilate.

c) Care is taken that individuals have their own different preferential learning approaches or styles, and therefore, different instruction delivery strategies must be adopted.

The theme of learning modes or styles, have promoted a number of studies and models, which may even differ substantially. From a certain point of view, this once more provides evidence that we are still far from corroborated certainties as to what learning is and how it takes place.

One of the most successful models, **Kolb's learning model** - envisages that all learner follow a learning cycle which goes through four phases:

1) concrete experience;

2) reflective observation;

3) conceptualization;

4) active experimentation.

A learning style may be coupled to each stage of the model, so that:

- through **reality**: an attitude to learn through tangible/ concrete/ real life events and things (first phase) ;
- through **meditation**: reflecting upon and interiorising experiences (second phase);
- through **abstraction**: by rationalising, re-organising, structuring, abstracting, modeling.....information. (third phase);
- through **action**: by doing things personally (fourth phase).

Each individual follows more or less the same cycle in learning, and therefore, is usually able to learn in all the four styles. However, each individual has his own rhythm or pace in completing the cycle, his own entry-point to the cycle and , above all, his preferential mode or style of learning. For instance, somebody learns better by doing things and somebody else by rationalising in his own way the same information or knowledge.

Important teaching/learning implications may be obtained from models of learning, such as Kolb's model. The first is that a "class" always has individuals with different learning styles, and therefore, it is necessary to envisage and implement differentiat instructional strategies.

A mix of teaching methods and media should always be considered , especially when teaching the fundamentals of the discipline, the key concepts, or new and/or difficult passages. This not only gives everyone a chance to learn, but it also reinforces the overall group-learning.

For example, if Pythagoras' Theorem is taught by starting from practical problems, making students reflect on the alternative solutions, then formalising the solution chosen (that is, the theorem) and finally applying it to various measuring experiments, then there will certainly be a more wide-spread understanding in the group and a deeper comprehension by the individual.

Naturally, all this has its price in terms of time and resources.Taking into account the individual paces and

styles of learning leads to the borderline of individualised instruction and, in any case, it requires more time. It is, in fact, a question of costs against benefits and the objectives to be reached. If the criterion of choice is the result, then the doubts cease. In training, where the guiding principle to be respected is that of leading all to success, the necessary time and resources should consequently be invested for this purpose.

Moreover, an approach which gives the students sufficient time and opportunites to assimilate (by suitably combining theories and practical applications, expository and participatory methods, written and audiovisual media) turns out to be, in the long run, more cost-effective in terms of time and resources, - and, in any case, undoubtly more pertinent to the needs.

Media of Instruction:

In the conventional school-system, the ways by which a student learns are essentially through oral communication and the reading of texts. Visual communication and practical exercises are only partially exploited.

Experiments undertaken in controlled conditions have demonstrated that learning,through the five senses, may be as follows:

taste	1.0 %
smell	1.5 %
touch	11.5 %
hearing	13.0 %
sight	73.0 %

This experiment highlights how important the visual method is, compared to other sensory channels.

Other experiments have demonstrated that the efficiency of the learning process in relation to the communication channel may be differentiated as follows:

Communication channel	Retention after 3 hrs	Retention after 3 days
* oral	70 %	10 %

* visual	72 %	20 %
* oral and visual	85 %	65 %

Once again, the importance of the visual channel, and even more the effectiveness of an oral/visual combination is evident.

Results such as the above, are eloquent on the use and potentiality of audiovisual media and of multi-media communication in general.

Other experiments demonstrate how memorisation may vary according to the learning medium:

Learning medium	Retention after 3 days
* reading	10 %
* listening	20 %
* seeing	30 %
* seeing and listening	50 %
* repeating/discussing	70 %
* doing/practice	90 %

In this instance too, the importance of the visual channel and of the combination of seeing and listening are evident. But even more stricking is the effectiveness of an active communication and of learning-by-doing.

This brings us to one of the most debated , and at the same time one of the most interesting themes in modern instructional methodology i.e. the active participation of the learners in their own learning process.

Involvement and active participation of the learner

There is no learning without self-learning. The learner cannot be "filled" with knowledge as one fills a container with water, nor can the student be moulded from the outside, like a piece of inert clay.

To assure that a new learning becomes an integrative part of the pre-existing cognitive structure, it is necessary that the learner undertakes (consciously or not), a "work" of assimilation.

This is a task which may vary from a simple adaptation

or interpretation of what is offered from the outside, to a complete structuring and re-organisation of the subject matter, according to the learner's personal method of incorporating fresh knowledge or new behaviour.

All lines of thought of learning psychology that have contributed to the body of knowledge of modern instructional methodology , although originating from different conceptions and proposing different solutions, agree that:

- learning is an active behaviour, sometimes demanding great energy and will;
- the more the learner is called to actively participate in the instruction/learning process, the greater the effectiveness of training.

Opinions differ concerning whether, and to what extent, the active participation of the learner becomes an indispensable condition for every type of learning. It certainly favours long-term retention of the more-advanced abilities and it certainly liberates energy, stimulates motivation and brings into play the learner' abilities and aptitudes.

Ansubel too, while supporting the supremacy of the exposure method as compared with the "active" teaching methods, specifically recognizes that in order to learn the learner must actively grasp the subject matter provided. His pedagogic message is to make this material as meaningful as possible for the learner, so that the student may more easily incorporate this knowledge into his cognitive structure.

Even Skinner's Programmed Instruction Method,based on the conviction that it is possible to mould human behaviour from the outside through systematic conditioning, presupposes - or rather specifically requires - the learner's participation, encouraging him/her in a guided way to demonstrate his/her learning by means of questions posed at close intervals in the course of the programme, sometimes even at the distance of a sentence.

The idea of the learner as an active subject in the learning process is, one of the strongholds of the methodologies based on cognitive psychology and, in particular, of the method called "learning-by-discovery".

In the "learning by discovery" approach, there is an actual shift in the "barycentre" of instruction from teaching to learning, to such an extent that the learner becomes the protagonist of the process.

It is the learner on his own who must "discover" the solutions, the relationships, the implications on the subject matter or the behaviour to be learnt. What is personally learnt or constructed is better assimilated, is retained longer, and may be transferred with greater ease to

other situations. The training system simply defines the subject field, establishes the general objectives of training, creates favourable conditions, and provides the material and assistance required.

The positions regarding the learner's "protagonism" in the teaching/learning context vary from one theorist to another. Gagné, for example, considers learning-through-experience valid only when the more advanced cognitive abilities come into play, such as the learning of principles, rules and problem-solving. Further, Gagne' supports a "guided" approach to discovery, while Bruner supports a freer approach and a wider application.

Within the sphere of training, and especially in managerial training, there was a period of excessive enthusiasm for "participatory" methods, as they represented the optimal solution to all learning situations. Today, a more eclectic approach prevails, and even the traditional lesson with one-way communication has been re-given its right place , in the light of certain aims and constraints.

There is no doubt, however, that instruction has developed enormously towards active learner participation.

Several "active" instructional techniques have been developed, such as case study, role-play, brainstorming, and many others. Techniques and instruments for simulation and games have been developed, that deeply involve the participants. In new computer-based training, efforts have been made and are still being made towards an ever-increasing perfection of man-machine interaction and provide the learner with an ever greater control over learning.

A great contribution has been given to the above development by the theorists of motivation, of communication and adult education (andragogy), enhancing the role of the learner as a person, and as an actor in the process of learning.

Learning-by-Doing

This paragraph could easily have been included in the previous theme, i.e. learner involvement and active participation.

It is purposely dealt with separately in order to better highlight the great importance and effectivesness that psycho-physical action has in the training context.

The above includes: concept application

exercices,learning of rules and procedures, practical laboratory exercices, both in the classroom or in real-life situations; active methods such as case-studies, role-playing, micro-teaching, business games, - and other forms of simulation with or without the use of aids or equipment, on-the-job training etc.

The fact that many things are learnt only by doing them again and again until they become automatic is obviously not new. It is a well-know fact, as well, that application exercises, experiments and practical experiences benefit and consolidate theoretical learning.

The innovative aspect brought in is a greater emphasis on practice and doing, as a medium for learning, and the perfecting of techniques and media that are particularly effective, as for example case studies and analogical and digital process simulators.

In industrial training, especially where the relationship between instruction and its direct application is closer, it is necessary to create training situations in which a strict relationship exists with the reality of actual work, and where the trainees learn "while they work". Exercises, simulations and, above all, a well-structured monitored on-the-job training system (OJT) are common practices.

Some forms of Computer-based training (CBT), such as digital simulators or interactvie videodiscs, have great potentiality in optimizing learning-by-doing.

Motivation of learners:

Motivation of learners as a must and as a tool for effective instruction, is another concept which is widely accepted by training practioners.

Learning requires a psychophysical and emotional investment, a modification of one's own cognitive structure and/or of one's own behaviour, and often also implies a risk factor: to become involved without having control over the situation, to be judged, to upset one's own set of values, etc.

In order to face the tasks, changes and risks, the would-be learner has to liberate energies, modify and lower his own defences. But in order to do all this, he must be motivated.

Motivation, as an intrinsic part of an individual's personality, may orginate from different sources - such as

ambition, the desire to be accepted, personal objectives, a need for security, the need for self-fulfiment, and so on... For the intrinsic motivations of the individual, there is little margin for the instructor to play, other than recognizing them and, where possible and pertinent, exploiting them for an effective instruction process.

On the other hand, a general influence on the learner "from the outside" is always possible, - both regarding the instructional settings and the actual instructional situation.

For instance, a favourable environment, readable and well-presented teaching material, the faith that the training system inspires in terms of useful results for the individual, the institution's prestige, the competence of the teaching staff etc., - are some of the aspects of the system on which make instruction and learning more motivating.

As to instructional situations, the learners must be considered responsible persons. They are to be guided in their learning process by explaining the learning objectives, by encouraging correct behaviour and responses, by favouring active participation, by varying the communication channels, by listening to them, and through many other motivational techniques so as to incentivate them to produce their effort and participate in the common endeavour of competence-transfer.

Effective Communication:

Another field where instructional methodology has experienced marked and useful innovations is that of communication between the teaching system: instructors, media and teaching material on one side and the learner on the other.

Firstly, the relatively poor effectiveness of monodirectional communication method has been pointed out (this being a typical defect of the magistrocentric model, whereby a large audience of students listens to a teacher's monologue.) The above has been integrated or rather replaced by multidirectional communication system , i.e. teacher - students, students - teacher, and when possible and useful, students - students.

By shifting the barycentre of instruciton from teaching to learning, many changes have taken place in instructional methods. It is imperative, for instance, that the instructor be a good listener, and able to interpret the messages sent by the students. The instructor must be able

to use the information that he has capted in order to know whether or not the trainee have understood, or whether they have problems, or if he needs to introduce corrective measures.

Furthermore, the instructor needs to be a competent interpreter of the non-verbal communication or body language i.e. glances, posture, silence, the tone of the voice, gestures, way of dressing, facial expressions etc.

It is equally important to provide - fairly systematically - a feed-back to the trainee in respect of his/her progress (Reinforcement).

Another aspect deserving much attention is the fact that in human interaction, every message always has a double function, i.e. an explicit/rational meaning and another meaning which is more or less intentional (of an affective-emotional nature). For example, it is one thing to say: "Give me the pen." with a certain tone of voice, and quite another to say: "Would you kindly give me the pen?" with a friendly tone.

Due attention should be given to the affective/emotional aspect of communication, since it greatly helps in motivating and creating a state of empathy between the instructor and the learners, which facilitates the exchange of information.

This is particularly true in the first phase of any new "moment" of training (a new course, a new day, a new lesson etc,) when the instructor must create a new state of "acceptability" and disinhibition (the so-called "warming up" phase), before proceeding to the transmission of messages with a higher technical/rational content.

Another very useful factor for effective communication is the change of the communication medium, i.e. from the spoken explanation to the visual illustration ; from the written text to demonstrations, from expounding concepts to discussing them, and so on. In this context, audiovisual media certainly play an important role.

The same principles and criteria that are behind effective interpersonal communication are true to a certain extent for communication through audiovisual media, printed courseware and computer-based software, although the relationship with the learners is obviously different.

Rather, communication through training media should respect even stricter criteria - especially during the production phase. In brief, either this type of communication is well designed or else it is of very little use. Texts, diagrams and audio must be "readable", the graphic aspect must be carefully prepared, the structure of contents rigorous, the use easy (friendly) and the message

pertinent to the contents and to the learning objectives.

Influencing the attitudes:

One of the most sensitive and often forgotten aspects of an effective instructional methodology is that of directing the action of training also towards the change of attitudes.

Sometimes, the change of attitudes is the most important factor for improving competences and job-performance.

An example is submitted, taken from a Training of Instructors course.

In the training of teachers/instructors/professors, the focus should be in changing, or more precisely, in influencing behaviours, attitudes and values.

Notably, the learner should be influenced so as to:

- Orient his work and seek results on the learner side, i.e. to value comprehension and learning much more than the perfection of his teaching (learner-centred instruction);
- Put himself in the mind of listeners and create a climate of empathy conducive to the accomplishment of a good learning performance.
- Systematically prepare his instructional tasks (lessons, exercises, tests etc).
- Precisely define beforehand the learning objective to be attained:
- Constantly verify comprehension and learning.
- Activate and responsibilise students in their own process of learning (assimilation).
- Use the group as an instructional resource: multiple-way communication, team-work, student-to-student transfer of instruction, exploitation of group dynamics.
- Exploit information feedback, backward and forward,i.e. from the sutdents to understand if comprehension and learning is taking place, and to students to direct and sustain their learning task.

- Vary instructional methods and communication media in order to adapt to different paces and styles of learning and to reinforce the acquisition of competence by all learners.

The above list is not intended to be exhaustive. The point is that a teacher equipped with these attitudes is already a long way ahead in instructional competences and surely he will harness more easily the building-up of skills and knowledge necessary for a good teaching performance.

Influence of attitudes may be attained through

* active involvement;
* reponsibilisation of learners
* learning-by-doing;
* dramatisation;
* getting the trainee to "feel" the advantages of the change required of him;
* reinforcing good performance;
* motivating the learners;
* creating an environment conducive to the will for change.

6. INDUSTRIAL AND VOCATIONAL TRAINING: STRATEGIC GUIDELINES

6. INDUSTRIAL AND VOCATIONAL TRAINING: STRATEGIC GUIDELINES

Foreword:

The question is:
"What should be the guiding principles of cost-effective industrial and vocational training?

Following, some basic institutional, curriculum development and instructional principles are simply outlined. No question of sacred texts. Only suggestions.

After the lengthly wording of previous pages, the statements which follow are taken as self-explanatory, therefore phrasing is the most concise.

Industrial and vocational training guidelines:

1. INSTITUTIONAL PRINCIPLES:

   * **Training as a sub-system of human resources management, itself a sub-system of a work organisation management.**

   * **Training as a tool for human resources qualification and development.**

   * **Management/employers involvement in training.**

     (in setting the goals, in controlling results, pushing for implementation ....)

   * **Training service/function/centre "professionally" staffed.**

   * **Exploitation of within-industry know-how holders**

     (managers, supervisors and skilled staff as propagators, part-time instructors, OJT tutors, courseware writers or co-writers, job competences experts for course design....)

   * **Exploitation of "organisation" opportunities and practices for improving/ upgrading job and/ or role competences.**

     (such as: attachment, job-rotation, rob enrichment, project assignments, on-site simulation, team work, up-dating and self-learning centres, individual development plans...)

2. TRAINING DESIGN (or curriculum development) PRINCIPLES:

* **Competency based training design (or curriculum development).**
* **Job-oriented courses of training.**
* **Methodic analysis and diagnosis of training needs.**
* **Precise definition of training objectives.**
* **Systematic design and planning of training activities.**
* **Rigorous control of result: learning outcomes and transfer of training to work setting.**

3. INSTRUCTIONAL PRINCIPLES:

* **Subordination of teaching to learning, that is, "learner-centred instruction."**

* **Methodic desing and planning of every instructional unit.**

* **Precise definition of learning objectives.**

* **Cognitive objectives subordinated to attitudinal and operative skill objectives.**

* **Continuous control of comprehension and of learning process as well as learning results.**

* **Involvement and responsibilisation of trainees in their own process of learning.**

* **Instruction fit for adult learners.**

* **Preference given to learning by doing.**

* **Use of active instructional methods**

  (such as: simulation, role-playing, case studies, group work, exercises, project assignment ...)

* **Success-oriented training.**

* **Multiple-way communication adopted, as a rule.**

* **Motivation of learners.**

* **Multi-methods and multi-media instruction delivery to match different indiviual learning style and paces.**

* **Over-training, applied when and where long-lasting and automated behaviours are required.**

  (such as: teaching a language or training to drive a car.)

ANNEX G

TRAINING OF TRAINERS: A REFERENCE GUIDE

ANNEX G

TRAINING OF TRAINERS: A REFERENCE GUIDE

INTRODUCTION

In this document a guide for the training of trainers is sketched as synthetically as possible.

Reference is made to industrial training, but most of the course of instruction envisaged may also be delivered, with due ajustments, to technical education and vocational training staff.

First, some guidelines for the design of the programmes are given, then an outline of a modular programme is presented followed by a matrix showing how the modules (obviously with different durations and extension of treatment) can be composed to form courses of training for at least three different professional profiles of trainers:

- Training manager or coordinator
- Instructional designer
- Instructor

The above are the basic professional staff of any industrial training centre/function.

PROGRAMMES GUIDELINES

The courses should cover two major aspects of the training function and of trainers'role:

a) **The institutional function of training**, industrial and vocational, which basically means the integration of training into the work organisation framework (be it a single company or an employment sector).

Training must be dealt with as an integral part of work organisations 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.

All the above implies that trainers' body of knowledge has to overlap with the Human Resources Management and Development competences, as well as with organisation knowledge, including the comprehension of all external variables affecting quality and availabity of the "human factor" in the world of work (labour market developments, technology innovations etc.)

b) **The specialist competences of trainers.**

In this context, the focus is on the specific competences requested by the training activity, and regarding design and planning of instruction, pedagogical aspects and training activity administration.

The programme of study must anyhow give priority to the instructional competences of the job of a trainer. In this perspective, the operative objectives to be stressed, especially for instructors (and designers too) should be of the kind:

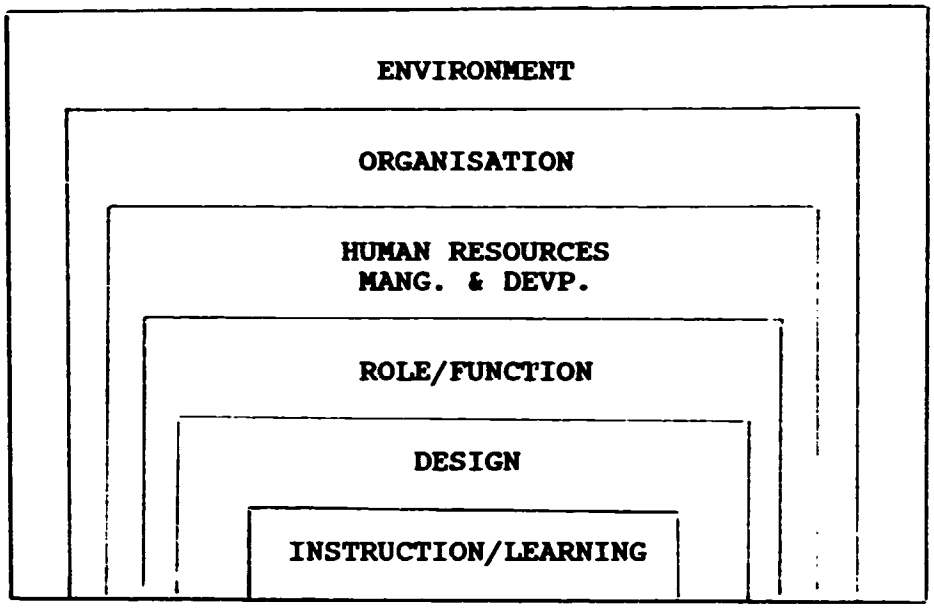
- How to design an instructional unit
- How to draw up a lesson plan
- How to state learning objectives
- How to construct learning assessment instruments
- How to make an effective classroom exposition
- How to communicate effectively
- How to motivate adult learners
- How to prepare transparencies
- etc.

For the designers, (and to a lesser extent, for the training managers) the operative objectives may sum-up in getting the participants to be able to "engineer" a training project covering the phases of:

- training needs analysis
- course design
- assessment of learning results.

From this core (the instructional core), the course has to build-up the competences related to the role and function of trainers, the Human Resources Management and Development practices, the organisation, and finally the environment

variables, as in the graph:



From the core outwards, the importance for the instructors training decreases while for training managers it increases. Instructional designers cover the largest span.

Of paramount importance must be the attitude objectives, which, without distinguishing among the various roles, may be summarised as follows.

- Systematic and methodical approach in providing training.
- Targeting any training action to learning and/or performance results, pre-defined by means of precise and verifiable objectives.
- To systematically check whether the envisaged training results have been attained.
- To always assure coherence in the programme of instruction between objectives, contents, learning evaluation techniques, entry level assessment tests and instructional methods.
- Orientation to the learner as the target-customer and to

learning outcomes as the immediate result of instruction.

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

- Positive approach to team working

- Open mind to an approach of training "engineering" which has to be, at the same time, methodic and creative, algorythmic and heuristic, procedural and flexible, according to the situation and goals to be pursued.
  An attitude of mind which may be termed "ad-hocratic" and which requires mastery of methods and techniques together with enough flexibility and pragmatism to choose, change, re-invent them according to constraints, opportunities , resources, and changing variables.

- To value human resources as really important, very often strategic, for social as well as economic goals.

- To believe in the individual's potential, especially as it concerns their responsibilisation in the learning process.

- To pay attention to the transfer of learning to the work setting.

As it concerns cognitive objectives, they must be subordinated to the attitudinal and to the operative (practical skills) objectives. Among these, there is the knowledge related to topics such as:

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

PROGRAMME OUTLINE

Module	Subject
1	INDUSTRIAL TRAINING FEATURES. ROLES AND COMPETENCES OF TRAINERS
2	INSTRUCTION AND LEARNING Theories, methods and techniques with special concern to adult education
3	WORK ORGANISATION , MANAGEMENT OF HUMAN RESOURCES AND TRAINING With field experience of job analysis (designers)
4	TRAINING SYSTEMS AND THE TRAINING PROCESS
5	TRAINING NEEDS ANALYSIS
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 (instructor and designer)
12	TEACHING DELIVERY TECHNIQUES With micro-teaching exercises

13 GROUP DYNAMICS

14 ON-THE-JOB TRAINING METHODS

15 TRAINING ACTIVITIES ADMINISTRATION

16 TRAINING CENTRE MANAGEMENT TOOLS

17 STUDY TOURS AND FIELD WORK

TRAINING OF TRAINERS COURSES : MODULES / ROLES MATRIX

MOD.	SUBJECT	DESIGN.	INSTR.	MANAG.
1.	INDUSTRIAL TRAINING FEATURES. ROLES & COMPETENCES OF TRAINERS	X	X	X
2	INSTRUCTION AND LEARNING	X	X	X
3.	WORK ORGANIZATION, MANAGEMENT OF HUMAN RESOURCES AND TRAINING	X		X
4	TRAINING SYSTEMS AND THE TRAINING PROCESS	X	X	X
5	TRAINING NEEDS ANALYSIS	X		
6	COURSE DESIGN	X		
7.	LEARNING ASSESSMENT AND EVALUATION OF TRAINING RESULTS	X	X	X
8.	TRAINING EQUIPMENT AND HARDWARE	X		X
9.	COURSEWARE : PRINTED,AUDIOVISUAL AND COMPUTER BASED	X	X	X
10.	INTRODUCTION TO COMPUTER BASED TRAINING	X	X	X
11.	DESIGN AND PLANNING OF INSTRUCTIONAL UNITS	X	X	
12.	TEACHING DELIVERY TECHNIQUES	X	X	
13.	GROUP DYNAMICS	X	X	X
14.	ON-THE-JOB TRAINING METHODS	X	X	X
15.	TRAINING ACTIVITIES ADMIN.	X		X
16.	TRAINING CENTRE MANAGEMENT TOOLS			X
17.	STUDY TOURS AND FIELD WORK	X		X

ANNEX H

UK's NATIONAL VOCATIONAL QUALIFICATIONS SYSTEM:

ANNEX H

UK's NATIONAL VOCATIONAL QUALIFICATIONS SYSTEM:

A new framework for vocational qualifications with great impact on the vocational and training delivery system as well as on the awarding system.

The Maltese vocational and technical education system has long been oriented towards the UK's systems. It is therefore suggested to carefully examine the undergoing changes in those systems, starting with the substantial innovation that the National Council for Vocational Qualifications (NCVQ) is bringing about.

What NCVQ and National Vocational Qualifications (NVQ) are, why the new system has come into being, how it works and other relevant information is well explained in a NCVQ information package complete of A/V aids especially devised for the staff involved in the development of the new system (NVQ : A Staff Development Programme) from where large excerpts are presented in the following pages. At the end of the excerpts, some critical issues are raised for consideration and a final conclusion on the relevance of the system for Malta is drawn-up.

Excerpts :

"INTRODUCTION

The creation of the National Council for Vocational Qualifications (NCVQ) in 1986 marked a major move towards changing vocational qualifications for the better.
NCVQ intends to have its framework of National Vocational Qualifications (NVQs) in place by 1991; the consequences for all involved in vocational education and training are profound.

The NCVQ can only achieve its objectives in partnership with other participants in the vocational education, training and qualification system. The number of individuals involved is immense and includes:

- Examining and validating body staff
- Training Agency staff
- Lead Body staff
- Educators and trainers
- Accredited Centre staff
- YTS and ET provider staff
- Employer staff involved in Training Agency programme work placements
- Specialist assessors ...."

"THE IMPORTANCE OF RELEVANT VOCATIONAL EDUCATION AND TRAINING

Vocational education and training must meet the real and pressing needs of individuals, employers and the economy...

...There has been a major restructuring of the economy over recent years bringing about changes in the skills required by the workforce. The international environment has become increasingly competitive and this trend will become ever more evident as we move towards a single European Market in 1992.

It is crucial therefore that Britain's workforce is skilled and adaptable so as to be able to meet this competitive, changing future. This means much more than adapting provision for young people. Older workers will be affected by change as the number of young people in our population declines. The established workforce must be able to adapt and take on new skills, and they must be encouraged to participate in Vocational Education and Training opportunities.

Vocational qualifications set targets for the vocational education and training system. They affect its utility, relevance and accessibility. A qualifications system is coherent, comprehensible and eliminates gaps."

"NATIONAL VOCATIONAL QUALIFICATIONS (NVQs)

A National Vocational Qualification is a statement of competence clearly relevant to work and intended to facilitate entry into or progression in employment, further education and training. Issued by a recognised body to an individual, the statement of competence should incorporate specified standards in:

- the ability to perform in a range of work related activities;
- the skills, knowledge and understanding which underpin such performance in employment.

THE OBJECTIVES OF THE NVQ FRAMEWORK

- to rationalise and update the system of qualifications
- to enable industry to set the standards of qualifications it needs (working with the Training Agency)
- to provide clearer paths for progression from one qualification to another
- to open access to qualifications and promote education and training. "

"LEVELS OF QUALIFICATIONS

At present there are four levels within the NVQ Framework, although the Framework may be extended after consultation with the professions and other interested bodies. Levels I to IV of the Framework are intended to cover the provision of NVQs from the most basic to those representing higher levels of competence. The number of levels may be extended beyond Level IV following consultations with the professions and other interested bodies.

At present it is only possible to provide typical descriptions of levels as vocational qualifications are still being developed.

Level I recognises competence in a range of work activities which are primarly routine and predictable or provide a broad foundation.

Level II recognises competence in a broader and more demanding range of work activities involving greater individual responsibility.

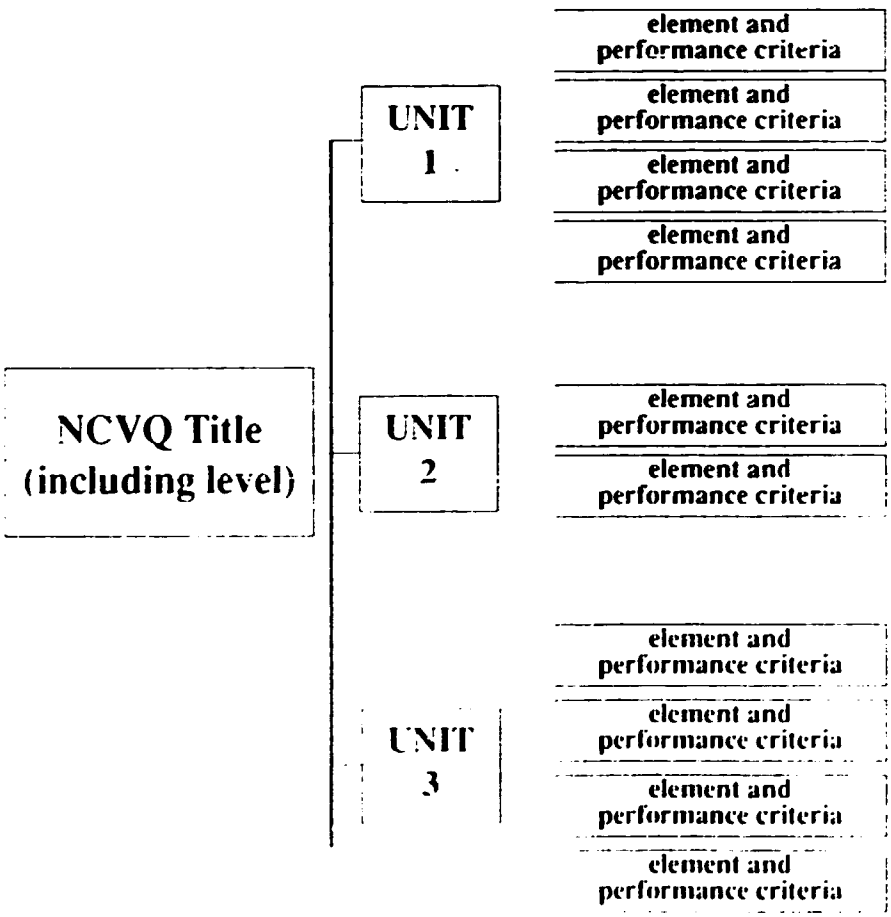
Level III recognises competence in skilled areas that involve perfomance of a broad range of work activities including many that are complex and non-routine.
Supervisory competence may be a requirement at this level.

Level IV recognises competence in the performance of complex, technical and professional work activities, including supervision or management. "

"UNITS OF COMPETENCE

Qualification will be made up of a number of units, each of which is recognisable and has value in employment. Units will be separately assessed and credited. Credits can be built up over time towards a qualification and full competence in an occupation. "

The Structure of the Statement of Competence



"WHY NCVQ IS NEEDED

NCVQ was set up because the Government felt that the existing system of qualifications was:

- not closely related to the needs of employment:
- over complex:
- resulting in too few of the working population having the relevant qualifications (only 40% hold vocational qualifications)".

THE AIMS OF NCVQ

- To improve vocational qualifications by basing them on the standards of competence required in employment.
- To establish a National Vocational Qualification Framework which is comprehensible and comprehensive and to facilitate access, progression and continued learning.

The following points provide the background to the setting up of NCVQ:

- The Government, in establishing NCVQ, set it a number of tasks including the introduction of a new National Vocational Qualification Framework in order to ensure that vocational education and training in England, Wales and Northern Ireland would meet the requirement of the 1990s.
- NCVQ was set up by the Government following the publication of the White Paper 'Working Together Education and Training' Cmmd 9823, July 1986.
- This White Paper followed the recommendations of the 'Review of Vocational Qualifications in England and Wales: A Report by the Working Group' HMSO, April 1986.
- The National Council is not an awarding body and does not offer qualifications. The Council will put its seal of approval on those qualifications which meet specified criteria, submitted to it by awarding bodies.
  These will be known as National Vocational Qualifications (NVQs). "

"STAGES IN THE DEVELOPMENT OF A NVQ

The development of a NVQ can be seen as falling into three stages:

(i) the definition of standards;

(ii) the incorporation of these standards into a qualification;

(iii) submission to NCVQ for accreditation.

Where the outcome of stage three falls short of full accreditation, further developemnt will be needed. "

"THE DEFINITION OF STANDARDS

The standards within the NVQ are employment led: industry itself defines the competences it requires and the performance criteria attached to these. The mechanism for this activity is the Lead Industry Body which undertakes to consult with and represent its industry. The Department of Employment's Training Agency is ensuring that standards are being defined by Lead Industry Bodies for all key employment sectors. A Lead Industry Body will typically access a range of industry views including employers, trade unions, educators and trainers.

In specifying competences and performance criteria the Lead Industry Bodies to an extent need to go back to basics, investigating and analysing what competences are required within occupations and the standards associated with these competences. Often, though, there will be a mass of existing documentary information of varying degrees of relevance which needs to be carefully sifted and where appropriate used. The final specification should be the result of a balanced consideration of information from a range of sources. Whatever sources are used, adequate consultation must take place to ensure that these standards accurately represent employment requirements.

The smallest specification of competence is the element of competence. An example of an element of competence from the Administrative, Business and Commercial Training Group is:

'Receive and Assist Visitors.'

Each element of competence is further described by a number of performance criteria. For example, in the case of 'Receive and Assist Visitors'.

- all visitors are greeted promptly and courteously;
- visitors needs are indentified;
- all visitors are directed and/or escorted appropriately;
- visitors are only given disclosable information.

The element and its associated performance criteria describe the standard required in employment. This is a national standard applicable throughout that employment sector. "

"THE INCORPORATION OF STANDARDS INTO A QUALIFICATION

Once a Lead Industry Body has defined its standards, these must be built into a qualification by an awarding body. A number of bodies such as the Business and Technician Education Council, City and Guilds of London Institute, London Chamber of Commerce Examinations Board, Pitman Examinations Istitute and RSA Examinations Board have a history of examining and validating for the award of vocational qualifications.
Increasingly other bodies, including industry organisations, are acting as awarding bodies.

The fact that a number of organisations have in the past offered vocational qualifications does not mean that these awards will necessarily be accredited as National Vocational Qualifications.
It must be clearly shown that any award put forward for accreditation does incorporate industry standards as well as meeting a range of other criteria. There is an emphasis in National Vocational Qualifications on performance which has not always been evident in vocational qualifications.

A National Vocational Qualification has,at its heart, a statement of competence. At the most detailed level are the element of competence and their associated performance criteria which describe employment standards.

Coherent groups of elements of competence are brought together to form units of competence: each unit should have a value in employment.

Finally, the National Vocational Qualification itself is made up fron a number of units of competence representing a significant range of occupational performance. The

qualification has a title indicating the occupational area and level of the award. "

"SUBMISSION TO NCVQ FOR ACCREDITATION

The National Council for Vocational Qualifications employs Development Officers who will be involved in discussions with an awarding body, offering advice during the development of a qualification. Awarding body staff thus have help from the early stages in creating a qualification which meets with the NCVQ's requirements.

This close involvement in the development of a qualification ensures that the Development Officer has all the necessary information when the time comes to put the qualification before the Accreditation Advisory Committee.

The Accreditation Advisory Committee is made up largely from members of the Council itself, joined by experts in the field of qualifications, and representatives from professional bodies. The Accreditation Advisory Committee considers whether the submission meets the Criteria laid down for National Vocational Qualifications and makes a recommendation to the National Council.

The actual decision whether to accredit a qualification or not is made by the National Council which is appointed by the Secretary of State for Employment. Three decisions are possible:

(i) to fully accredit the qualification;

(ii) to conditionally accredit the qualification for a set period subject to the awarding body working with NCVQ to bring the qualification more closely in line with NVQ criteria;

(iii) not to accredit the qualification.

The process is far from being a rubber stamping exercise. Each qualification is considered very carefully against the requirements of the NVQ Criteria. These criteria have been set down to bring about the changes which are the remit of NCVQ and many qualifications cannot meet them fully at first.

Accreditation is thus often a two stage process: where the Criteria are substantially met conditional accreditation may be given for a limited period, usually two years, during which time the awarding body will be expected to make the changes specified in the conditions. Full accreditation may then follow."

"THE NVQ CRITERIA

The NVQ Criteria are fundamental to NCVQ's objectives and must all be satisfied in order for a qualification to be fully accredited.... the key features of the criteria (are summed up) using a mnemonic:

- Competence based
- Relevant to employment
- Independent of learning
- To national standards
- Equal opportunities
- Range of activities
- Industry involvement
- Assessment to standards "

END OF EXCERPTS

WARNING NOTES

Three warning notes are here submitted for critical consideration.

1 VERTICALIZATION OF COMPETENCES:

A NVQ like system may lead, if not properly managed, to peaks of specialization, putting on a low profile a broad based set of competences and completely out of worth any form of instruction that looks "academic".

Should this happen, it might become a problem when one passes from highly specialized roles to supervisory or integrating roles.

In Malta, the problem may be even more acute, because, due particularly to the constraint of small numbers, a Maltese worker ought to be more multi-skill and more flexible than a British counterpart.

The above does not touch the value of the NVQ system; it is a warning against a blind and rigid use of it. It must be clear that the training directly connected to the performance criteria of NVQ profiles does not exclude other forms of competence acquisition and "educational" instruction and self-learning. NVQ defines what is needed, does not restrict the options.

2. THE CREDITS JAIL:

NVQ areas of competences (qualifications) are made up of UNITS of competence, (themselves constituted of elements of competence with attached criteria of performance).

The Units may be "acquired" by individuals in the most appropriate way and times they prefer and can afford, and may be "spent" on the labour market under the form of CREDITS. The amount of Units determines the amount of Credits the worker may rely upon in respect of the employment counterpart

Times change, people change, technologies change, employers change, careers and jobs change. To rely too much on Credits accumulation as the exchange currency on the labour market may finally prove futile for the workers and the employers.

Here again is not the system under fire, but the blind use of it.

3. THE BRIDGE BETWEEN QUALIFICATION PROFILES AND TRAINING:

The NVQ system is bringing a more precise and valuable link between the needs of employment and the training delivery system. Not only the competences needed for an occupational area are clearly defined, but also the urderpinning knowledge and understanding are detected and stated.

This is great for training purposes. But is not training planning.

National Vocational Qualifications,although they are supposed to influence and direct training, they still remain qualifications profiles. They are the starting point, the right starting point, which curriculum development or instructional design of vocational and industrial training has to refer to for defining the training needs for specific training programmes.

The warning here is not to overestimate the help that NVQ profiles may provide to training programmes. A heavy task of curriculum development or instructional design has to be done downstream NVQ profiles.

CONCLUSIONS

The new Vocational Qualifications framework do really work and surely will change training delivery patterns in England, Wales and Northern Ireland, including methods, procedures and programmes of traditional and new awarding bodies.

Malta has much to learn and borrow from that experience, provided the adaptation to the Malta environment is properly filtered and adapted by professional staff.

Should the suggestion be followed, two other suggestions are closely linked to it:

1. The entire UK vocational and training system should be revisited, notably: the Further Education Unit for the training delivery system, the Training Agency of the Department of Employment for the setting up of the stardard of performance, the Educational Council for Educational Technology for training resources , the Open Learning systems and institutions providing new patterns of training and so on.

   All the above without depriving the Maltese innovators of the opportunity to investigate and borrow valuable methods, experiences and material from other countries like Italy, Germany, France, Swuitzerland etc.

2. The model cannot be transferred as it is to Malta.(It would not, in any case, be cost-effective.)

   It should only be considered for reference purposes and for learning how to ameliorate the national system

   Of particular interest is the huge amount of qualification profiles with their performance criteria and underpinning knowledge, that will sooner or later be available.

   From that material, a competent training designer could very well extract useful pieces and paradigma for devising training curricula suitable for Malta environment.

   Attention must be paid, however, to the dynamics of any qualification (they change with time and depend from changes of many other variables) and to cultural, situational and environment differences.

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