INFORMATION PROCESSING TRAINING IN ADULT EDUCATION

EUROPEAN SEMINARY ORGANISED BY THE

GENERAL DIRECTION FOR SOCIAL AFFAIRS

Luxemburg, 9th to 13th December 1974

Final report

COMMISSION OF
THE EUROPEAN COMMUNITIES

INFORMATION
PROCESSING TRAINING
IN ADULT EDUCATION

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INTRODUCTION

First of all, an European seminary is the meeting of an altogether representative and heterogenous human group on a problem of common interest. In this sense it constitutes for its participants an experience of lived integration in a temporary information and communication system, susceptible, within the limits of the time imparted to them, to consider the problems and build up answers, starting from the data initially available and in function of individual and collective approaches characterizing the programme development.

On the other hand, and this is the organisers' viewpoint, the seminary is, with regard to the overall activities of the Commission, a particularly well-adapted work-tool, when a given problem has to be quickly summarized in order to promote thought and action in the direction of desirable solutions.

In this double perspective, the present report aims at contributing to a better knowledge of the situation and present problems of data processing training. It further wants to be a reference document for the policies to be defined and the actions to be taken in this field in the countries of the Community. In this regard this report does not appear to be an analytical statement but an integrated development of the various contributions in conformity with the approach followed by the seminary : it starts from the analysis of the common and national contexts as well as from the study of the problems, to evidence orientations for an educational policy of data processing, defined by referring to its conceptual frame and in terms of actions to be undertaken. This approach is shown in the page 1.a of the content.

CONTENT

1st. part : THE SEMINARY

1. – Origin, objectives, orientations

Essentially the seminary derived from a statement of relative deficiency – with regard to the insufficient human development in front of the development of data processing – and from the Community's viewpoint, it was further framed by two supplementary concerns : considerations of education and uses seen namely from the angle of the interventions of the Social European Fund and concerns about the development of an European policy for data processing.

Centered upon the educational problems raised for the personnel in an « organisation » by the introduction of the data processing system, by its evolution or by the development of its applications, it essentially aimed at two objectives :

1. state, with the cooperation and for the benefit of the participating parties and the different interested classes, the present conditions, the approaches of the problems and the solutions promoted in the countries of the European Community ;

2. study, starting from a critical analysis of the situation and of the present realisations, the main problems of common interest as well as the improvements to be made to data processing education and propose actions to be taken in pursuance of this aim at the different levels (organisation, nation, community).

In this broad view and further, as has been stressed on the one hand by Mr. Rifflet and Mr. Toffanin and on the other hand by Mr. Layton during the initial sessions, the seminary might be a contribution

• to the definition of a data processing educational policy and – a reference frame for projects to be developed in this field ;

• to the launching of a common data processing policy aiming at simultaneously developing its industrial bases and its applications.

3

2. - The participants

Most of the 39 participants had responsible functions in data processing education and they represented .

— all the countries of the European Community – with the exception of the Great-Duchy of Luxemburg ;

— the various interested spheres : national Civil Services, educational organisations, entreprises, professional organisations for employers and employees ;

— the different activity sectors : industries, trade and services, administrative services, training, teaching and research institutions.

Diagramme 1 on the nearby page shows some aspects of the seminary. The participants' list appears in enclosure 1, their distribution in the three work-groups can be seen in enclosure 2.

3. - Programme and development

The seminary programme, the time-table of which appears next to this, mentions the time division and had been structured in three phases with alternating full sessions and work-groups

— **The initial phase** (A – 6 sessions) : an informative phase of identification and selection of the problems. It was placed on a general and conceptual level aiming at supplying basic data on the common orientations and conditions existing in the member-countries, as well as at setting-up a first inventory of problems to be examined by the seminary ;

— **a central phase** (B – 4 sessions) an informative and exploratory phase in studying the problems, aiming at deepening and enlargening the data on training experiments performed in the member-countries, at confronting the problem-approaches and solutions which already have been realised as well as initiating the study of the problems and projects in view of the 3rd phase ;

— **a final phase** (C – 7 sessions) on the works, projects and a synthesis in view of studying more thoroughly the problems by setting-up an educational project on data processing and defining a conceptual reference and orientation frame for the actions to be taken in this field.

ASPECT OF THE SEMINARY
(based upon the data available to 38 participants)

1. EDUCATION – EXPERIENCE

speak their mother language and
one or two other languages
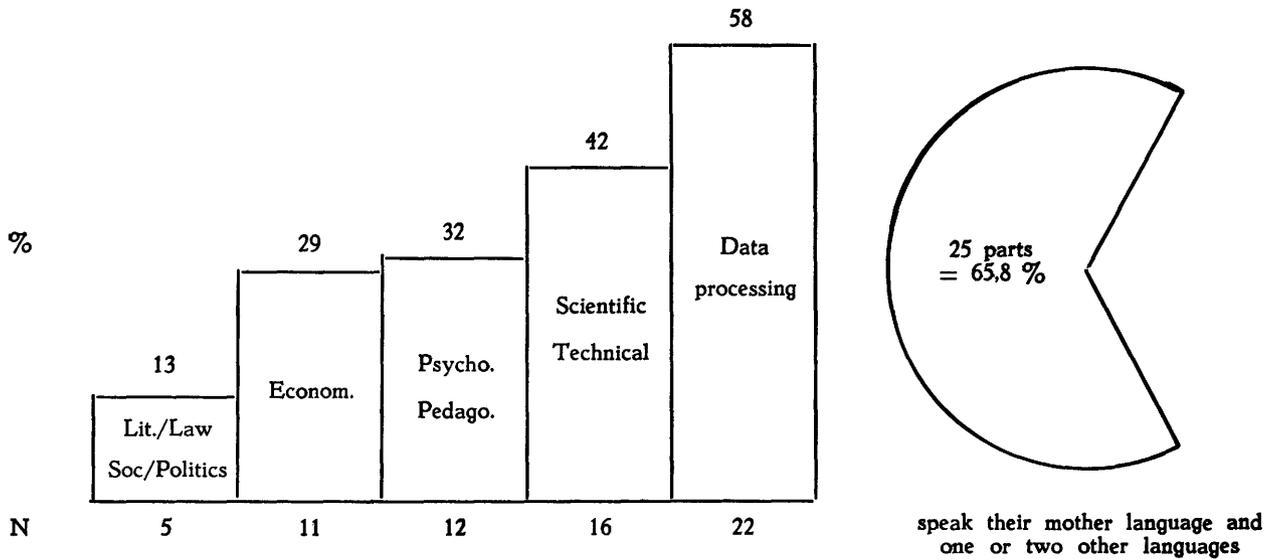
2. ACTIVITY SECTORS

AND TRAINING

5
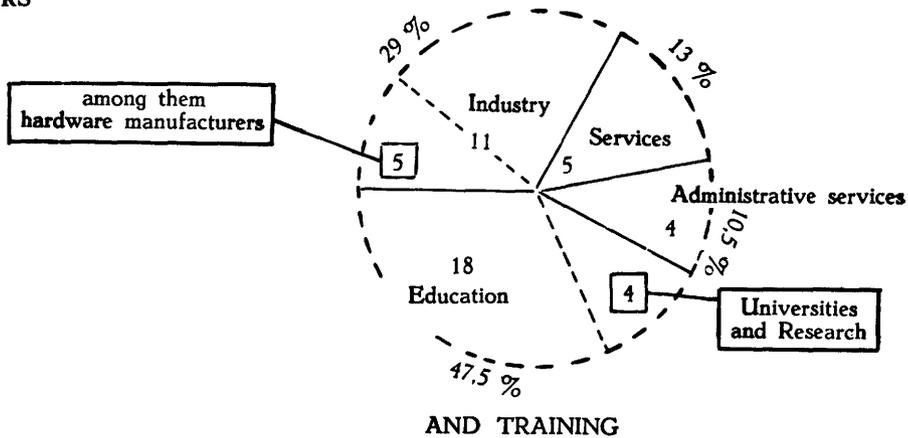
3. THE FUNCTIONS IN THE FIELD OF TRAINING

Out of the 30 participants intervening directly in the training
- — 19, or 63 % perform a managing function
- — 11, or 37 %, perform a coordinating/educational function

4. THE PARTIPANTS' AGE

%

	15,8	21,1	36,9	26,3
			14	
	6	8		10
N	24 à 30	31 à 40	41 à 50	> 50

= 43 years
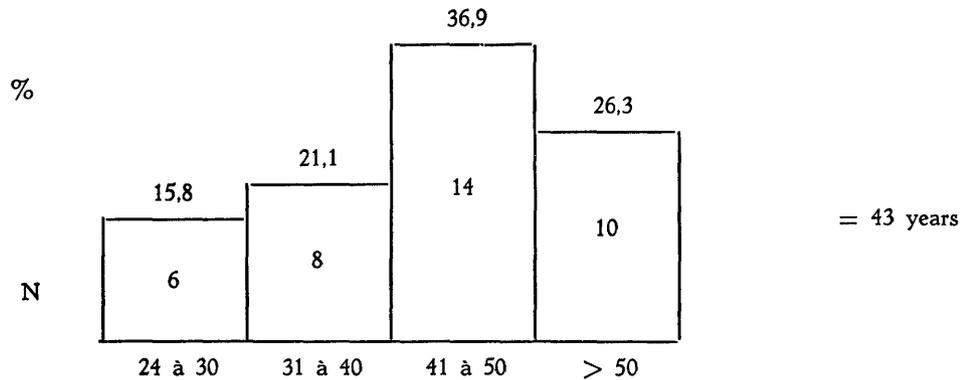
5. THEIR CONCERNS PRIOR TO THE SEMINARY (in preferential sequence)

1) The training conception in data processing
  * the needs and resources
  * the functions and the qualifications
  * the methods and the contents
  * the educators (generally/ at high level)
  * the structures (which may/must perform the training)

2) The dialogue data processors – users

3) The information on users' training

4) The impact of data processing on the organisation of the society.

The elaboration, organisation and management of the seminary have been performed by the Division « Preparatory works to interventions of the Social European Fund » under Mr. Toffanin's responsibily as Head Adviser, with Mr. G. Fotré's cooperation (Institut pour la Promotion par la Formation Permanente – Paris) and the technical and administrative cooperation of Diner's Club Service for Seminaries – Belgium.

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SCHEDULE – TIMETABLE

		Morning	Afternoon
Monday 9th		Opening of the seminary Mr. TOFFANIN, EEC Mr. FOTRE Statement and discussion on the objectives and programme of the seminary **A1** – Common orientations Mr. RIFFLET LAYTON EEC – general discussion	**A2** – Conditions, needs, problems of data processing training **A3** – Chairman Mr. TOFFANIN Speakers Mr. FOTRE, BLACKBURN, COMHAIRE, CROISDALE, EPPELE, GRIFFITHS, PANIZZI, SCHMAEDECKE, SCHMIDT — general discussion
Tuesday 10th		**A4** – Conditions, needs, problems group-debate — questions — orientations for further works **A5** – common participation in full assembly * Answers to questions * Orientations for further works	**B1** – Educational trials (2) Mr. BARDI, Mr. HENNEMUTH — Statement and discussion in full assembly **B2** – Work in groups * Study of problems * Study of projects
Wednesday 11th.		**B3** – Educational trials (2) Mr. WILLE, Mr. MORRIS ● Statement and discussion in full assembly **B4** – Educational trials (2) Mr. THOMAS, Mr. DE SMET ● Statement and discussion in full assembly	— Visit **C1** – Definition of projects – Work in groups
Thursday 12th.		**C2** – Project works in groups **C3** – Project works in groups — Common participation in full assembly	**C4** – Project works in groups **C5** – Project works in groups
Fr 13th.		**C6** – Balance of works — Statement and discussion of group-reports in full assembly	**C7** – Balance of works – Synthesis and evaluation in full assembly – Conclusion of the seminary Mr. TOFFANIN, EEC

1 – Use, education and data processing
– Common orientations and interventions [1])

In front of the development of data processing and its growing importance in all the fields of human and social activities, Europe seems to have the required size for offering a better solution to the common problems.

Data processing, a problem of European dimensions

At the Community's level the main problem is the wild, not integrated nor coordinated development of what is much more than an advanced technology but an instrument, which is susceptible to modify all the processes of the economic and social organisation. The under-employment of the data processing potential, the limited applications of it, to the field of « micro-rationality », the difficulties experienced at its introduction, once more evidence the importance of the human substructures for technical, economic and social progress as well as the need of overall development patterns.

Another aspect of the problem is the condition of technological and industrial dependency of the European countries in data processing : more than 90 % of the computers used in Europe depend on the American technology ; 60 % of the World and European computer-market is handled by one single American manufacturer.

The Community contribution to solving these problems presently is directed according to two principles

Possible answers

1. **a common policy for data processing** aiming at expanding the competitive capacity of computer industries of European origin and at a more efficient use of data processing ;

2. **a modern employment policy,** apt to permanently take charge of the difficulties and to enhance human promotion and development in front

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1) In this chapter the essential arguments, presented in the statements made by messrs Rifflet, Toffanin and Layton as well as in the following discussion, are mentioned.

of the technical and economic mutations, for which the Social European Fund may become the promotional and catalysing instrument.

As the **data processing policy** is concerned, and following a proposal made by the Commission, to meet the orientations defined in this regard by the Top Conference of Paris, the Council has adopted a resolution in July 1974 by which

- the Council intends to give a common orientation to the support and promotional policies in data processing,

- the Council further takes the engagement to decide on the proposals, which might be presented by the Commission as from 1974 concerning :
  - projects for the application field
  - a cooperation concerning the standards, the applications and the public purchase policy
  - a project promotion for industrial development ;

- The Council considers the setting-up of a systematic common programme to be desirable at medium term, in order to promote research, industrial development and data processing applications.

Upon this base, the Commission is preparing detailed proposals for actions, which necessarily will be accompanied by educational steps not only destined to universities and specialists, but also to the users, and to a larger extent, to the personnel who are indirectly affected by the introduction and expansion of data processing systems.

The ways and means of a common action

As the **employment and education policies** are concerned, the Social European Fund's mission not only consists in financing routine actions but also in supporting policies which are integrated in an overall scheme, in promoting projects having qualitative effects. If its part is to face employment difficulties and to reduce the regional disparities [1], the Fund also is a supporting instrument for common policies and actions [2], as shown by the provisions established in 1972 in favour of the agriculturers who were moving to other activity sectors and to the benefit of workers in the textile branch and, finally in 1974 in favour of the professional readaptation of handicaped persons and the education of migrating workers.

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1) Intervention by force of article 5   of Council Decision of February 1st 1971 concerning
2) Interventions by force of article 4   the reformation of the Social European Fund (O.j. Nr L 28 of February 2nd 1971).

The diversity of national and regional realities, as well as the human variety confronted with these realities call for a diversified action adapted to every special situation. The Social European Fund, intervening upon requests made by public and private organisations, supported by the governments following the approval given by the tripartite Committee, takes charge of 50 % of the expenses. It may represent, as far as common policies and actions will progressively be defined in the various fields, a pilot experiment at the scale of 400 million – currency units per year.

In this perspective, the Social European Fund also may contribute to a better solution of employment and educational problems raised by data processing in the Community.

FLOW-CHART OF A TRAINING ACTION

7. Lead the training action

6. Determine the tactics

5. Define the strategy

EVALUATION

4. Define the objectives

3. Determine the needs

2. Define the training problem

12   1. Analysis of the total situation
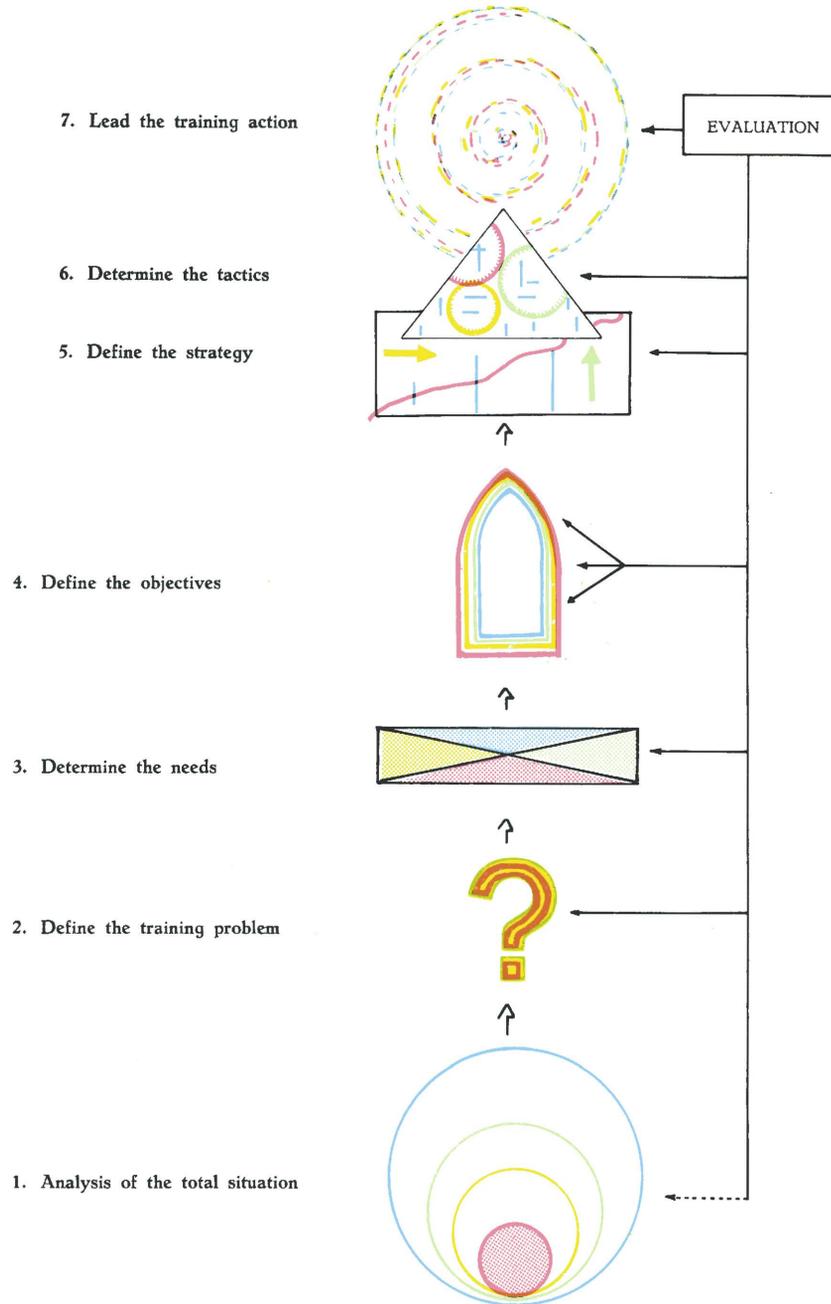
2 – Conditions and problems of data processing education [1]

The fact of wondering about the ends and media of data processing training, means to apply to education, the pattern of experimental methods, starting from the analysis of all the factors (economic, technical, social, cultural factors...) and of the relationships and interactions, which totally feature the insertion of data processing in the social organisation. Once the essence of the data processing phenomenon will have been ascertained and identified, as well as its part played in organisations and societies and further the conditions and requirements of its integration, so the study of the problems may then be considered together with the educational needs and the solutions to be found in terms of objectives, strategy and tactics (the intervention structures, the people to be educated, the teachers, the programmes, the contents, the methods and the media, the evaluation of the results).

This approach, which is evidenced by the nearby diagramme 2, has served as a leading guide to the works of the seminary.

1. Data processing, the organisation and the social economic system

Data processing [2] is a complex phenomenon, characterised by considerable innovation, and progressively invading all the fields of activity, however still not integrated in our present industrial civilisation, of which it is nevertheless one of the symbols and constant references. Therefore data processing appears as

Data processing a complex phenomenon...

- an advanced technology, the hardware of which has passed within less than 30 years from the first to the fourth generation – whereas the software underwent, with some delay, an accelerated evolution of the languages, the development of data management and programmations, the intercommunication and interaction of data processing systems ;

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1) This chapter, just as the following ones, is based upon the reports and discussions of phases A (basic data) and B (educational trials) as well as upon the project investigations and debates of phase C. Enclosure 3 refers to the work documents elaborated prior to the seminary and during the works.

2) Data processing is defined as the « rational treatment, namely by automatic machines, of information considered as the base of knowledge and communication in the technical, economic and social fields ». (Definition given by the Académie française).

DATA PROCESSING SYSTEM AND ENVIRONMENT

- a strongly concentrated **advanced industry** with a world turnover of some 18 billion – currency units, with a growth-index of 15 % per year, stimulated by an important, often public effort for research and development, employing 2,5 million persons and susceptible to become – so were the experts' forecasts before the recession – the third world industry by 1980 ;
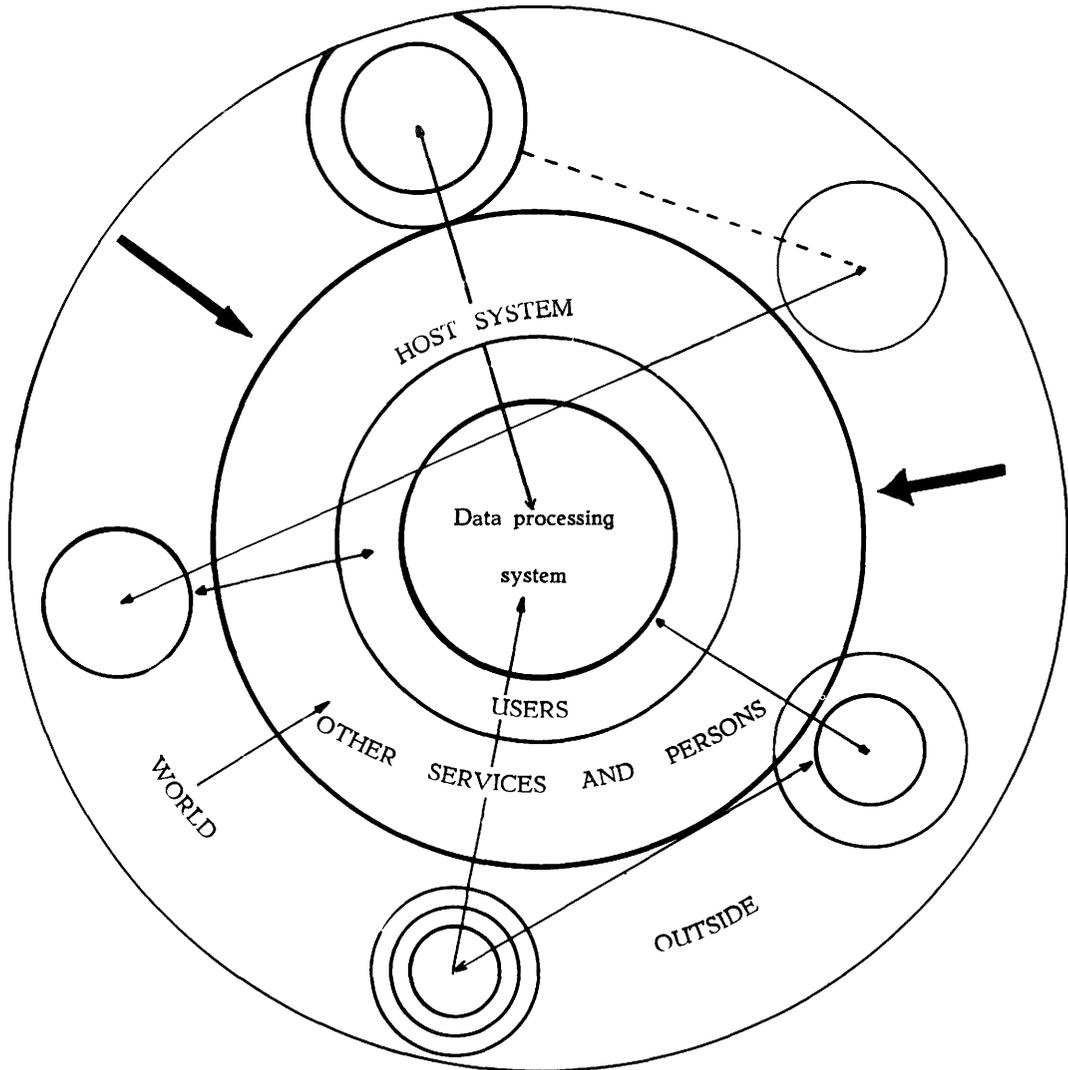
... an original tool for information processing

- **a powerful system of information processing** with a capacity, a rapidity of execution and a fiability unknown up till now, due to which it is the instrument of choice capable of mastering the growing flows of information and communications in an organisation (plant, administrative service) and in society.

The originality of the system is its interference in what may constitute, together with the raw materials and energy, the possibly essential factor of modern production processes for goods and services : information, which not only defines the technology, the products and production methods (essence, type, form, quantity, terms, cost-prices, etc), but is also the very substance of the relationship in the whole man-organisation system, and on a broader scale, in the social system. The data processing system thus interferes in the last reserved field of human activity – after the replacement of physical power by mechanical power – and through the use of computers participates in the conflict man-machine.

Its applications reaching from the simple registration of data to the most sophisticated operations – for instance the piloting of a spatial flight – presently cover the most varied fields, such as scientific research and technique, automation, management and direction of entreprises and production control, documentation, teaching and education.

... sub-system of the organisation and its environment

In the perspective of the seminary, the essential question raised at this stage is to know how the data processing system is conceived and performed in an organisation ; which phenomena derive from the meeting between a sub-system man-machine and the organisation seen as a technical and social system, how the mutual adjustments are performed. Theoretically and ideally reference can be made in this approach to the nearby scheme (diagramme 3) in which several interacting systems can be detected :

- **the information processing system,** including on the one hand, the processors – analysts and system conceptors, programmers, masters of projects, operation masters, operators, desk controllers, perforators, etc – and, on the other hand, the hardware and the software – entry units, memories, processing units, output units, programmes, etc. ;

- **the host-system,** representing the « organisation » divided, according to the relationship intensity with the information processing system, in two areas

    - **the users,** services and persons supplying data or receptioning the data processed by the information system – and, among these persons, the staff-members who are responsible for the efficiency of the organisation ;

    - **The other services and persons** of the organisation, who are more or less affected by the information processing system ;

- **the outside world** corresponding to all the social-economic, technical, cultural, political systems in which the organisation is participating.

The integration of data processing in the organisation : a process of mutual adaptation . . .

The study of this scheme first suggests that the integration of an information processing system – which is itself a particular case and a « mechanised » part of a total data processing system – into an organisation requires a mutual adaptation process as much for the organisational structures and methods as for the men. If, beyond the rentability necessity of an expensive investment, this integration raises technical problems in terms of conception and performance of the system, of hardware and software, which have to be adapted to the organisation needs, it seems quite evident that the success or failure depends still more on the organisational capacity and management – thus finally on men.

. . . raising still unsolved problems

Experience has shown that prior to being a catalyser, an instrument of rationalisation and greater efficiency, data processing often reveals the deficiencies of the organisation, that juxtaposition is more frequent than symbiosis, that for many organisations, the reference to the « information processing system » seems too early and that more realistically the use, if not the under-use, of computers should be considered.

It further appears that data processing tends to impose its restraints – systems, information and communication circuits, hardware and software – and simultaneously may modify not always as a progress, the organisation model, the entreprise structures and the work organisation.

As other applications of technical advance, the use of data processing is not univocal : it effectively may induce a better information flow, new forms for relations and cooperation and thus contribute to increased efficiency of the organisation and satisfaction for men. However, it also may give birth to new information monopolies, strengthen the centralisation and rigidity of the entity.

Data processing contributes, according to the part it is given and to the application fields, to a modification of the structures, functions and professional qualifications, as much with regard to managing and medium staff-members as for the executive personnel. These modifications either tend to increased competences and qualifications, or to impoverishing the tasks.

Based upon a new and quickly evolving technology, data processing still shows a lack of standards and its history is entirely in the present. Moreover, it seems not very accessible to most members of the personnel, awakes the old fear of the machine, whereas information processors, considered to be the new Templar knights of the industrial civilisation, compete with the organisers for a redistribution of the power.

Further, each system is an original creation ; there exist as many information systems as organisation and application types. This being added to the relative determinism imposed by the manufacturers of hardware and sometimes of software, evidences the necessity of a sufficient economic and technical capacity, often linked to the organisation size. There is a source of discrimination in the chances of access to data processing between large and small entreprises. This discrimination is based simultaneously on the investment possibilities for hardware and people and on the available « know-how », and may be detrimental to small entreprises, due to disadvantages on the economic and competitive level as well as on the work-market.

Here some explanations can be found for the relative under-use of the data processing potential in spite of its extraordinary development. Its privileged applications in the entreprises are still management (accountancy, orders, stores, etc), production planning for goods and services, personnel management (salaries, individual files, etc) less frequently, management control or operational research and very seldomly the decisional field.

For administrative services where the introduction of data processing is performed generally more slowly and shyly, it seems that its contribution to policy formulation is exceptional and that it is mainly applied to administrative management, budget and financial management (taxes, impositions, social security, population, etc) as well as to internal management (wages and salaries, storage controls, etc).

Information processing and the social economic system

At a more general level this scheme further evidences the area of relations and interactions between the data processing system, the organisation and the outside world and the lines of force of this area may positively or negatively influence the rational development and use of information processing in entreprises, administrative services or in the community.

In this regard the following may be mentioned :
- the presence or absence of a data processing industry, the extent of independence or dependence of the users from the manufacturers ;
- the presence or absence of a programme and an action started by public instances in the field of data processing (for instance the information processing programmes set-up by the German federal government or the French « calculation plan »), the taking charge or the coordination of efforts regarding research development, industrial development, employment forecasts, teaching, information and education, development of social applications of data processing ;
- the opinion on data processing of the economic and social operators, of the multipliers (large information media, teachers and educators) and of the public.

Finally it seems that the problems met at the introduction of information processing, understood as a satisfactory social and economic rationalisation, proceed from a rather rough knowledge and appreciation – at the level of society considered as a whole, just as at the level of the decision-makers –, of the very essence of the information processing phenomenon and of its impact upon an organisation or social economic system as a whole.

A new machine or much more ?

Information processing still largely is, beyond its myth, a matter of « specialists ». Because of a lack of integrated development of the economic, technological, social and cultural aspects, we are not only confronted with an under-use of the available potential, but with this « gap between the economic and technological development and the human condition », which characterised up till now the introduction of « technical progress » in the industrial societies.

The information processing phenomenon shows in fact this ambiguity, in terms of chances and dangers, for the individuals as well as for the organisations and for the community.

Often compared to a steam-machine because of the amplitude of its implications, information processing differs from it in two essential points :

- first by its essence : it is not a machine – even if the computer has a large part in it – but a « system », i.e. an entity of elements which are organised in function of the aim to be reached : in this case, control of the information factor, the base of knowledge, which in turn is a constituent of power. This clearly shows that information processing risks to deprive man of his part, of this up till then unreplacable part of polyvalent

agent in information processing, prior to bereaving him of his autonomy in his professional and private life, if not of his identity and personality due to the use which can be made of « data » stored in central data banks ;

• further because information processing appears at a different period of the social evolution, at a time, at which in the very name of the principles ruling our societies, the changes have to be understood, to be accepted. At the period of the replacement of the physical power by the mechanical power, not everybody needed to understand the steam-machine. Nowadays conditions are changed – the more so, that this replacement affects the methods of perception, direction and control and thought. And let us recall that the development of the steam-machine raised other problems than the engine-drivers' training.

It thus may be concluded, that the acceptance of the change induced by information processing in all the fields, is a much bigger obstacle than the technical difficulties – even if it is agreed that it offers real chances of modification – in the sense of more democracy and humanity – of the organisation and work-conditions, social transformation by the access of the largest number to knowledge and by the service improvement offered to the community (for example, administrative services, health, education).

An old error

It appears that the major error of appreciation has consisted up to now, in considering information processing as a technological process and not as a social process, in privileging the hardware and software technicity to the detriment of the human capacity of organisation, communication and development. Although the error is old and derives to some extent, from the logics of the social economic system, it appears to be more impressive because it applies to what is considered as an advanced technology. The error is illustrated by the gap pointed out at the end of the seminary : « with regard to the 4th generation of hardware and the 2nd generation of software, we only have reached the 1st generation for education and training ».

Starting from this overall analysis of the interactions between the information processing system and its environment (organisation, society) – and considering that they are a problem of European dimensions and common responsibility – the seminary proceeded to a more detailed study of the educational problems.

2. Information processing and education

The previous analysis evidenced some problems, which undoubtly are pertaining to another level than education, but which education may

Education, a contribution to the solution of the problems ?

contribute to solve – this was clearly the work hypothesis of the seminary. The assumption applies, for instance, to the development of the organisation and communication capacity parallely to the technical capacity, further to the synchronous development of hardware and software, or more generally, to the preparation of structures and men for mastering information processing.

The study of the realisations and presently applied methods for information processing education however reveals, in spite of some pilot-experiences and very remarkable performances, some deficiencies and lacks, due, on the one hand, to the relationship system between education, data processing, organisation and society and, on the other hand, to the very educational system. What is concerned, is first of all the part and the place of education in the organisation and the society, its concept according to its functions or its economic, social, cultural and human purposes ; what is further concerned, is the effective capacity of the educational system – of the structures, men, methods, contents, media – to identify and meet the human needs, – the needs for organisations, society and, finally to realise an educational policy serving the development of the entreprise as well as the human development.

Among the evidenced difficulties and deficiencies, the following factors should more particularly be stressed :

● **Educational policy and planning**

Generally there are no total policies, which might give a total and coherent response to the educational needs for information processing, but mainly adequate interventions, which are better defined by the contents than by the objectives and often derive from a fairly narrow and mainly technical vision of the problems in data processing.

The absence of policies

These interventions are the more difficult to finalise that they may neither refer, for a new and rapidly evolving system, to a clear definition of the functions and tasks imparted to the different personnel categories to be educated, nor to the needs deriving from the relations and interactions of these different categories in the data processing system and its environment. They tend to favour the education of information processing specialists to the detriment of the training for users, both being more an operational training than an education in view of using a system and seldomly conceived in function of a carreer-plan.

The absence of a logical policy induces, on the one hand, an excessive change of the information processing personnel, which is fostered by deficient engagement criteria – qualification levels are not adapted to the really required competences – and by mutual « looting » of top level specialists ; on the other hand, the absence of policy does not allow the setting-up of integrated user-information processor-teams and thus induces among the staff-members as well as among the organisation personnel reject reactions.

- **Intervention structures**

Offers on the market of information processing education are numerous and diversified in most countries of the Community, however they are of variable quality and often not very well adapted to the specific needs of the organisations and also fairly expensive [1]).

Numerous and diversified offers ...

In variable proportions, according to the countries and the organisation size, the education is given by hardware manufacturers, users – essentially those using medium and large systems –, private and public teaching organisations depending from professional federations, from universities and schools.

Abundant offers may be an advantage for the consumers, however they also may puzzle them in such a field as information processing, as far as the interventions are performed in dispersed sequence, the know-how transfer is difficult, due to a lack of coordination, and the effects of competition and educational efficiency only appear after the interventions.

... however not always adapted to the needs

The standardisation of the programmes, the development of educational « packages » certainly represent a progress in the diffusion of knowledge as well as in the proportion : cost- efficiency of education, nevertheless they have the disadvantage of too narrow a dependency from hardware and software and of inadaptation to the characteristics of the systems and men of the organisation.

Finally the scarcity of educators, who are capable of intervening in high level education without loss of efficiency is revealed.

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1) The cost for data processing personnel is estimated to 1/3 of the information processing budget of an organisation ; the Belgian ONEM evaluated the educational costs for a programmer at 200.000,– Bf.

Still fewer are the educators, who have not only been properly trained, but have a real information processing culture and are capable of an integrated approach of the different aspects and problems.

- **The intervention methods – The contents and modes**

The absence of an educational policy as well as the weaknesses which are inherent to the structures, have inevitable repercussions upon the educational actions in data processing. Thus :

- the education often is fragmentary, too specialised, centered too much on the data processing technology and too little upon the management and operation of an information processing system in the service of the organisation ;

Some defects of the educational system

- education often is not apt to determine the necds and objectives nor to have a clear image of the interactions between information processing and the organisation nor of the evolution of the functions and the tasks ;

- So, education shows a trend to aim at technical objectives and concerns only some groups or categories of the personnel ; further, the interbranch approach required for training men, who participate in a technical and social system, is neglected, as the interface problems between the groups and the persons are ignored ;

- The educational contents only seldomly refer, for some groups and categories (information processing personnel, staff-members), to a well-defined information processing substrate, but often are imposed through the determinism of the hardware and software as well as by the educators, education and experience – the teaching methods largely remain traditional – to be understood as the transmission of knowledge by somebody who knows to somebody who doesnot know – and are not directed to the development of an autonomous thinking process in the educated person. This has to be stated in spite of the use made of modern pedagogic techniques and media (programmed teaching and its applications, TV, computer assisted teaching, studies of cases, simulations etc.) ;

- The relationship between theoretical education and practical training, the relationship between education and practical application or also the correlation between educational cost and efficiency, remain quite uncertain. Quite exceptionally an educational project is integrated in an information processing project ;

- in some countries the problems concerning the availability of means for education, the access of adult workers to education, the financing of the activities and the taking charge of probationing students have not been solved.

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At the end of this analysis of conditions and educational problems in data processing, the necessity appears to develop in this regard an overall policy, susceptible of contributing to a better appreciation of the integration possibilities and conditions as well as to a better use of information processing in the organisations and community.

The third part of the report presents orientations, which were elaborated by the seminary in this direction.

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Considered in terms of technical, economic, social rationality, education always only is a partial, of course important and often decisive, project, which however is necessarily subordinated to a larger scheme, the finalities , which it serves. This implies that education must have the possibility to refer to an overall policy, as much at the level of the organisations as at that of the society, with regard to data processing. This policy should further integrate as well the technological, industrial and economic aspects as the social and human ones. Such a policy – a theme largely beyond the competences of the seminary – should be based upon the sufficiently explicit concept of the place and the part of information processing in the entreprises, administrative services, communities and society. Its definition as well as its operation seem to extend beyond the confrontation frame of the economic and social powers present in the organisations, to be commanded by public debates and controls.

Information and education - a priority for an information processing policy

On the contrary, the realisation of an intensive information and education policy appears in the present conditions to be a priority – and even a preliminary to the realisation of an information processing policy. This is the more true, that the information processing project, just as the education project, is not a goal but a means. It therefore is quite understandable that information and education may and must contribute, in the relationship between knowledge-will-power, not only to demythify data processing, but to allow the participation of the largest number of persons to the determination and use of the services it can offer to men, organisations and society.

These concerns can be seen in the orientations proposed by the seminary, involving, on the one hand, an attempt to define a first common conceptual frame for an information and education policy and, on the other hand, elements for a first programme of action. It is probably not useless, in order to situate these orientations, to recall that the seminary was centered on the educational problems raised, for the personnel inside of an organisation, by the introduction of information processing, the evolution of this system or the development of its applications.

MODEL TO ANALYSE THE TRAINING NEEDS

TRAINING NEEDS

A. specific needs

B. common needs (interface)
1. technical needs
2. social needs
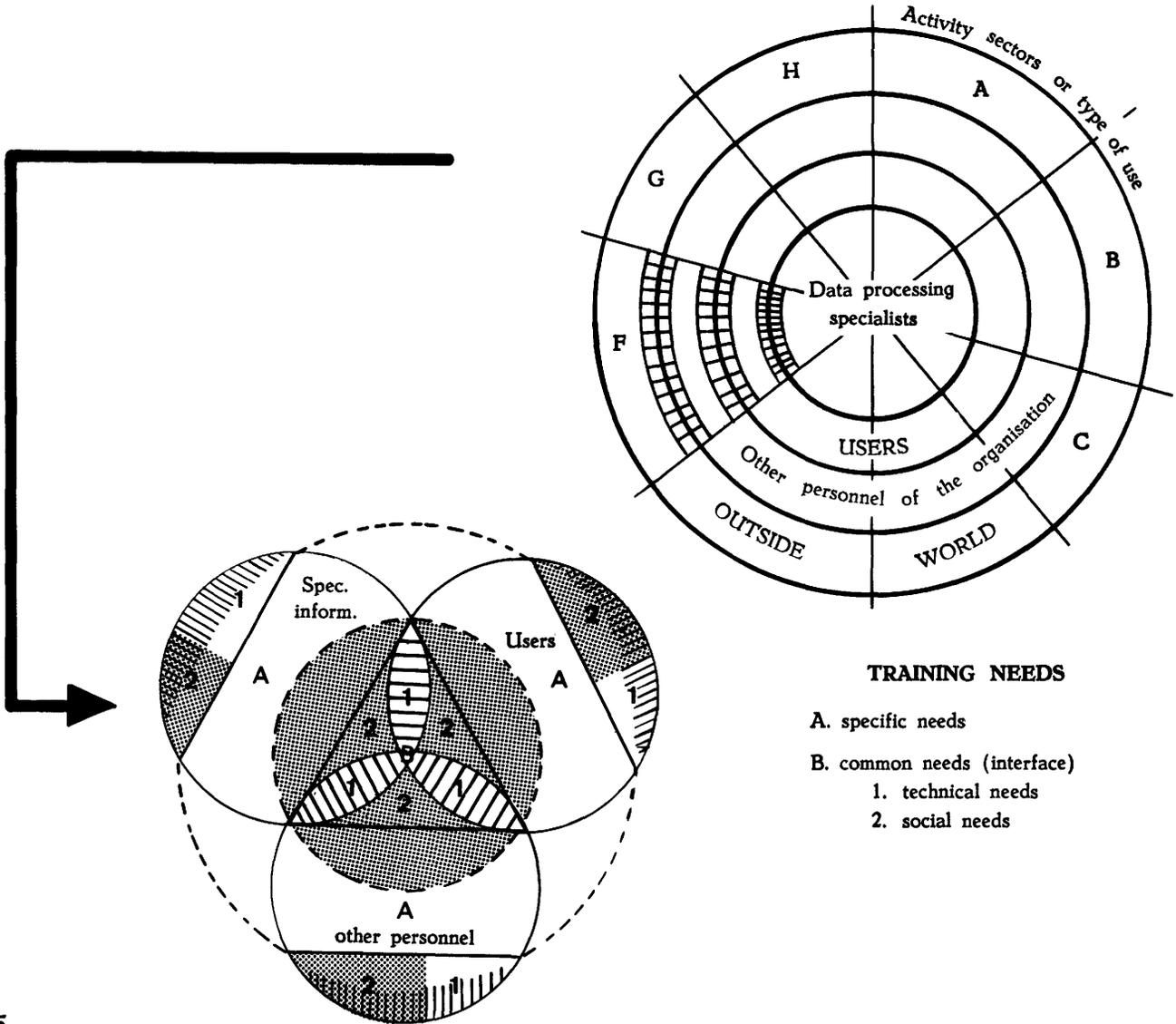
1. – The conceptual frame

1. The determination of the needs

The determination of the educational needs, which derives from the analysis of the overall conditions and of the study of the problems to be solved [1] – has to consider, at the analytical and synthetical levels, an entity of interdepending fields and factors : the functions, the tasks, the structures and their expectable evolution, the men and the various systems, inside or outside of the organisation, in which they participate [2].

This cannot easily be brought back to the classical equation $En = rq - aq$ in which the educational needs are the différence between the required qualifications per work points (the « first circle » in diagramme 2) and the available qualifications.

In fact it is quite difficult to integrate and convert in educational needs having qualitative and quantitative, cognitive and affective features, technical and economic data, organisational facts as well as elements belonging to the psycho-sociological and cultural fields. This raises at once fundamental as well as methodological problems. Nevertheless the results of this approach determine to a very large extent the development of the process – the definition of the objectives and the realisation of the education –, thus its very efficiency.

Although the seminary could not present a « solution » in this very precise field, it interestingly contributed to approaching the problem as well as the methodological elements for determining the educational needs. Thus :

The approach of the problem

- The needs are less commanded by the **information processing education** than by the **education to use information processing** ; therefore particular attention has to be given, in this perspective, altogether to the processors' needs and to the direct and indirect users' needs, starting with the definition of **specific** needs and needs which are **common** to different groups. This approach is illustrated by the nearby diagramme 4 ;

- the analysis of the obstacles and difficulties met at the introduction or efficient use of information processing allows to locate and identify some diffuse educational, mostly not specifically technical needs,

1) see 2nd part, p. 13 and diagramme 2
2) see 2nd part, pp. 15 and 16 and diagramme 3

which information processing contributes to evidence, for instance :

– **inside of the organisations**

  – the deficiencies in the structures and the management, the lack of a clear definition of the objectives, parts and reference standards known by all the members of the organisation ;

  – the deficiencies with regard to the policy, the management and education of the personnel ; the place and the part of education in the organisation ;

  – the resistances opposed to organisational modifications, to changes of methods, work-conditions, the reactions of the structure (disorganisation, centralisation, power conflicts) ;

  – the fears regarding the employment (impoverishing of the tasks or additional requirements, work-overload, loss of autonomy, « robotisation », job reduction) ;

  – the lack of information and consultation of the personnel ;

  – the difficulties of communication between the information processors (first of all technicians and considering data processing as their special field) and the other groups of the personnel, who question the efficiency of data processing and feel that they have to serve it ;

  – the lack of attention given by the system conceptors, to the effects of information processing on the organisation and its personnel ;

– **outside of the organisations**

  – the institutional and legislative deficiencies (lacks in basic education, in the protection of the individual liberties and private life) ;

  – the image of information processing (complexity, vulnerability), its negative perception (no beneficial influence on individuals and society, fear for employment, refusal to change for change's sake) and the relationship between costs and efficiency ;

  – the attitude of professional groups and organisations (jobs, professional classes, power) ;

  – the absence of coordinated action between industry, research development and information education ;

New needs and new requirements for the staff-members

- at the management level, information processing appears as an instrument and as the natural consequence of the introduction of cybernetic methods in the organisation, the control and regulation capacity of which is quite directly linked to the efficiency of the information and communication system. This generates for staff-members [1]) new needs and new requirements in the intellectual and psycho-sociological fields, these needs and requirements not being covered by a basic education giving more attention to the acquisition of knowledge than to the development of thinking and expression processes.

These needs more particularly concern for the « users »,

- the capacity of « system thinking », which allows to accept the constraints of information processing and to adapt to it ;

- the capacity of imagining and formulating a problem fitting the information processing system, i.e. allowing an easy « conversion » in programmes as well as the processing by the computer ; what applies to data entry also applies to the output use. Proper utilisation of the output requires high mental capacities of assimilation, appreciation and development of output data, which are particularly dense and formalised ;

- the creativity applied to the investigation of new applications, which may not only be trusted to data processors alone and which may contribute to improve the decisional process as well as the efficiency of the organisation ;

- at the psychological-sociological level, the capacity based upon high intelligence and social receptivity, to establish and evaluate the relationship between quantitative and qualitative data, thus the capacity of objectivating information and the capacity of integrating oneself and animating the cooperation processes between specialists having different qualifications and responsibilities.

Finally for the information procesors themselves, the instrumentalised character of their education, the use of abstract codes and mathematical and logistical formulae evidence an important need for communication development.

- from the methodological viewpoint, the seminary has detected three elements which are susceptible to contribute to a better determination

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1) The study of the organisation pattern and of the work-relationships should allow to determine what has to be understood in this sense by « staff-members » and possibly evidence that these needs and requirements also interest other personnel categories.

of the training needs and thus to start educational actions adapted to the needs :

A useful reference : an operational repertory of the information processing professions

- first of all, the setting-up for information processing professions of an « operational repertory of professions and jobs », which might be inspired by the experimental pattern set-up by the French Agence Nationale pour l'Emploi ; this repertory aiming at creating a common language between the agency services and the users as well as at easing the linking of employment offers and requests, could be adapted to the training needs and serve as a reference for professional structures and qualifications regarding the information processing professions.

An extract of the A.N.P.E. repertory is given hereafter in enclosure A/4 ; it includes, besides the presentation of the repertory and list of cards, three models of « characteristic cards » : for the application programmer, the functional analyst and the computer operator ;

Models to determine the needs...

- secondly, a determinating procedure of the training needs to be applied simultaneously to the introduction of a data processing system and covering altogether the social and the technical fields of the organisation ; this procedure includes three stages as shown by nearby diagramme 5 ;

... and the development of a programme

- finally, as this is a training having to meet the requests of the work-market, the programme development used by the Association Nationale pour la Formation Professionnelle des Adultes (A.F.P.A.) in France. This procedure operates, at the stage of the determination of the needs as well as at the stage of the designing, trying and validation of the programme, a cooperation system between, on the one hand, a technical group and, on the other hand, a national tripartite commission and a parity sub-commission.

The scheme of this procedure together with a short comment appears in enclosure 4/B.

DETERMINATION PROCESS OF THE NEEDS

STAGES	THINGS TO BE DONE	TRAINING NEEDS
1. Preliminary study	1. Establish uses of the computer 2. Determine impact on organisation 3. Consider « social » impact 4. Justify proposals to all interested bodies	Need for educated host system management
2. Full study	1. Investigate and analyse 2. Define user requirement 3. Design host-system procedures 4. Design computer-system procedures 5. Justify 6. Plan implementation 7. Procure facilities (computer, accomodation, ...)	Need for system analysts Need for designers Need for designers Need for project management
3. Implementation	1. Create host-system procedures 2. Create computer-system procedures 3. Prove the systems 4. Change-over 5. Review	Need for additional specialists Need for users' education and training

2. The objectives and the application points

Generally a training policy aims at serving three types of objectives or finalities, which may be considered, according the the chosen viewpoint, as supplementary or difficult to harmonise :

- **the economic objective,** which pursues the valorisation of human resources, a condition for the fair operation and development of the organisation or of the economic and social system ;

- **the social objective,** which proposes to realise full employment, even a better use of manpower and thus to offer promotion and carreer chances, to easy the necessary adaptations ;

- **the human and cultural objective,** which aims at the human development, at developing men's capacities to situate themselves, to understand, to act in the different spheres to which they participate, to master changes.

According to these objectives a training policy for information processing also has to be defined, if this education ambitions – which is another fundamental objective – to meet the needs expressed in the orientations discussed in point 1 hereabove.

More specially, this training should have the following objectives :

- contribute to a better appreciation of the utilisation possibilities and conditions of data processing in the organisation and in society ;

- take data processing out of the reserved field of specialists and create the conditions for a new approach to data processing and its use ;

- aim, not only at the acquisition of some data processing qualification, which may vary according to the groups and the individuals – but necessarily must include a « vital cultural minimum » – but also and perhaps mainly involve the adaptation of the structures, organisation systems, information and communication, which means to develop men in order to make the structures evolve.

The application points are located altogether in the outside environment and inside of the organisations :

- the « large public » needs to understand and situate the data processing phenomenon in order to participate to the clearing-up of its utilisation conditions and to the development of its applications.

**specific
objectives...**

**... and the
application
points**

31

Two privileged ways appear for this impregnation action : the school system and permanent education ;

- **inside of the organisations,** the specific information and education needs of each group have to be met. These specific needs derive from their place and part in the data processing system and in the organisation ; however the interface problems between the different groups have also to be met, as their solution appears to be the condition of successful integration of data processing in the organisation.
For one part specific, and for another part common basic actions [1]) have to be developed in function of general, technical and intermediary objectives, to define in every case, starting from the analysis of needs in the direction of the following target – groups :

- the educators, who are destined to perform these trainings,

- the head staff-members of the organisation,

- the personnel of the organisation,

- the medium staff-members,

- the data processing personnel,

- the heads of the personnel,

- the staff-members and the using personnel,

- the persons affected by the applications of data processing.

In fact the organisations must therefore have at their disposal an educational service capable of forecasting and matching its evolution : identification of the problems and training needs, definition of the objectives, development of strategies and application of tactics adapted to the conditions of the the organisation and the personnel. By this, the development of an educational technology is assumed, which is susceptible to transform this action in terms of processes, instruments, contents and methods, which comes down to stressing the necessity of an intensive and broad action in the educators' direction.

3. Strategies and training tactics

As has been noted hereabove, the realisation of an educational policy meeting the established objectives has to pass through the development

1) see diagramme 4

of a range of operations and through the operation of a range of media, the strategic and tactical choices of which very largely depend on the particular conditions of the organisation and its environment. However, beyond the diversity of the structures, institutional and cultural models, methods and contents, the seminary has considered some orientations, which may be of general value, as well as some learnings drawn from experience and which may be transferred to other conditions.

Therefore the following facts should be recalled :

- **the data processing action in the direction of the large public** should be based upon the impact of data processing and its consequences on the various aspects of professional life (jobs, qualifications, decision-making processes, work-conditions, humanisation of work, etc.) and social life (education, information, health, struggle against poverty and pollution, protection of liberties, etc).

This informative action, just as the research activities, which necessarily will have to feed it, belong to the responsibilities of official instances ;

Responsibilities and part to be played by the official instances

- with regard to the training structures, some diversity seems necessary and desirable in the present conditions. Thus, the using organisations, the manufacturers, the public and private educational institutes, the universities and the school-system have an additional and often specific part to play in this field – by accepting the idea that some competition may be favourable to the development and qualitative improvement of the education.

However it should be possible for the different intervening parties to refer to common directives and standards, to benefit also from the transfer of knowledge and know-how and to have access to the results of research and experience. There is, just as for the educators' qualification or for the access conditions to education for the workers, a twofold necessity of orientation and coordination which can only be answered by the public official instances ;

The data processing branch- the common subjects

- to define the **training contents,** not only technology and qualification to specified jobs have to be considered, but also the requirements of the men-organisation system, the requirements linked to personal development and to the carreer of the already educated persons. Therefore training requires an interbranch approach, allowing the integration in the system of scientific and technical elements as well as data offered by human and social sciences (economic theories,

system theories, information and communication theories, psychological-sociological facts, logical data and methodologies etc).

Trials performed in the IBM training centres as well as in the training and perfection services for staff-members of the industrial association of Rhineland-Westphalia may show the way to be followed in the direction of this integration. In this field further the necessity appears not only of an overall definition of the data processing branch, but also a definition of the « common subjects » for the different data processing specialties and for the interfacing groups in the organisation.

A special effort should moreover be made for the development of the documentation used in training.

- in terms of **planning and programmation,** education is conceived first as a continuous action developing the human capacity to meet the requirements of the present day and to contribute to-morrow to the evolution of the system and its applications, but also to the evolution of the organisation.

A training project integrated to the development of men and organisation

Training efficiency is strengthened as far as the programmes establish a correct relationship between intensive education, practical « assisted » application and work experience and essentially as far as the training project is operationally integrated in the data processing plan and in the development plan of carreers in the organisation. This has been evidenced, for instance by the experiments of the Olivetti company, by Computer Power, I.B.M. and I.C.L. or by the trials made at Karstadt ;

- finally with regard to the **training methods,** the essence as well as the characteristics of data processing training and of the to be educated people apparently impose resort to be made to a coherent methodological entity, which should be adapted
  - to adults, i.e. a methodology capable of settling the apprenticeship conditions and of organising the cognition processes and the affective motivations as from the experience gained by the trained people ;
  - adapted to the objectives and educational contents, thus to a dominating active line, integrating the methods and the techniques of the cognition process, of the training to techniques developing the intellectual, logical and methodological capacities as well as the psychological and social apprenticeship process ;

– preserving the trained people's autonomy and personality.

To realise these orientations, which represent as many training conditions, is in most cases a challenge to the organisations, to the structures and to the men who animate them, as this comes down to a better evaluation of the intensity of the efforts to be made as well as to a more accurate detection of the application points of the efforts in view of adjusting the strategies and the tactics to the dimensions of the problems to be solved.

2 – The actions to be started

Just as the seminary appeared to be useful as an exploring exercise in the field, apt to situate the training problems in data processing in an altogether larger and more rational perspective, it also may constitute the starting point of some actions to be performed at the level of the organisations, member-States and Community.

In this regard the opportunity of such actions might be questioned, as the present conditions oblige the countries of the Community to look for solutions to problems raised by the economic recession and its reactions on employment, which are much more important and urgent, and to dedicate to them by priority all the available resources.

On the contrary, the slowing-down of the economic activity might also be the opportunity to take up in data processing training a part of the delay accumulated during the growth-period. At least two arguments may be mentioned in favour of a thorough study of this hypothesis : on the one hand, the existence of systems damping the social effects of the recession may easy, in opposition to what happens in periods of high activity, the access to education of a larger number of workers ; on the other hand, training actions, which presently are often developed on a large scale without clearly defined finalities because of the very dubiousness of the evolution of the work-market, would gain by integrating, in a way better adapted to the various populations, data processing training in their objectives and programmes.

In a more general view, the setting-up of an European plan for data processing can only seem desirable. Its industrial and technological elements – foreseen in the medium term programme should however be part of a more total vision granting a fair part to the social economic and educational

aspects. The second data processing programme of the German Federal Republic might be a useful reference in this matter.

In its own field, the seminary proposed that the Community would foster the promotion of a double mission

- an informative and educational mission linked to employment and to the work-field,

- an informative and educational mission directed towards the citizens.

The corresponding actions could be concentrated on the following points :

1. Promotion of studies and trials on the development of data processing and education

This action might concern the information and education of the large public as well as the information and education of the workers, and aim at

- contributing to a better knowledge, by all the concerned spheres, of the essence of the data processing phenomenon, of its possibilities and use conditions, of its effects on professional and social life for the individuals, the organisations, the society. Particular attention should be given to pointing out the social usefulness of information processing.

  A thorough study, based upon investigations, which already have been performed in the countries of the Community, could meet these objectives ;

- by developing, from a factual and methodological viewpoint, the investigation of the needs and of the planning (objectives, contents, methods, educators, evaluation in relation to personnel planning and the employment and training policy), of the training to be performed in the various activity sectors in view of different uses and for the different target-groups, a special attention being given to the needs resulting of interface-problems.

  A series of studies performed on a representative sample and conducted coordinately in the different organisations could induce an indispensable progress in this field : in fact, progress is effectively a condition indispensable to the development of a training technology, as it is susceptible to increase its efficiency and consequently has to

be reached prior to the development and experimentation of the hereafter mentioned programmes ;

— by developing training programmes for the educators intervening in data processing training, and, more generally speaking, for the « multipliers » (staff-members in plants and administrative services, animators and responsible managers of organisations and educational institutions). These programmes should be supported by pilot-trials to be performed in the different countries and in different contexts.

2. Promotion of a training policy for the workers

This action, which might altogether represent the line of force of common action and the large scale and real size experimentation field for the learnings to be drawn from the above proposed studies and experiments, should be supported by the specific use of the means put at the disposal of the Social European Fund (art. 4).

This would be a privileged action for the « educators and multipliers » and it would be directed according to the previously defined orientations. The realisation of the corresponding operations should, as a rule, be trusted to public education institutions.

Finally, a maximal diffusion effect could be achieved through the intermediary of the « multipliers » by the systematic organisation of meetings, information courses, exchanges of experience and the publication of the results of performed investigations and trials.

3. Promotion of the introduction of information processing in the school-systems and in permanent education

This action, which might be backed by an injunction to the member-States, should in priority be directed to the future teachers as well as to the teachers and educators, who are presently in function.

On the one hand, this action might be prepared with the participation of a « discussion group », which would define the leading principles and fix the programmes to be recommended to the school and university authorities, after the inventory of the trials in course ; on the other hand, this action could be supported by a « common information and documentation centre », operating within the frame of the European Centre

for professional training and in connection with the homologous national centres. The common centre would be in charge of the coordination of the national actions, would fix priorities with regard to the information and documentation actions to be developed, would prepare basic data, collect and distribute pedagogic material, for the information and education of the public, for the users, for the teachers and educators. The development of a multi-media programme resorting to the radio and TV could be considered for this purpose.

4th part : IMPRESSIONS AND CONCLUSIONS

1 – The participants' impressions

During the final session the participants considered that the seminary constituted an useful contribution

- to a larger general view of the training problems in data processing and of the conditions and approaches in the different countries ;

- to the appraisal of the importance of an overall data processing policy and of the impact of information and training on the designing and performance of this policy and of the European size of these problems and solution possibilities,
  and simultaneously an incitation to thinking and action.

Their criticisms and proposals mainly concerned the following points :

- improvement of the procedure for designating the participants and for composing the delegations ;

- earlier forwarding of the invitations and work-documents ;

- more explicit definition of the purpose and objectives of the seminary to allow the participants to become more aware of their own mission ;

- better selection of the training experiments in order to cover various sectors and types of interventions ;

- during the meetings, reduction of the information phase to leave more time for group-investigations ;

- follow-up of the works of the seminary and pursuance of the cooperation in the field of data processing training in the direction indicated by the action proposals.

2 – The preliminary conclusions

In the final speech Mr. Toffanin has expressed his satisfaction concerning the general course of the seminary, which took place in an excellent

atmosphere, was marked by intensive exchanges, the participants' personal efforts and a very sustained rhythm of work.

He considered that the seminary had performed its duty by putting the problems in their true perspective and that its investigations should constitute the starting point for future action. In this perspective, training appears as the key-factor for the controlled development of data processing as well as its contribution to improved functioning of the organisations and society. The intervention lines which become apparent – the Social European Fund being included – essentially concern the training to be given to the educators as well as the education to be given to the users and, more generally to the workers, who are affected by data processing.

As a conclusion Mr. Toffanin expressed his satisfaction not only for the unanimity on some matters, but also for the various viewpoints revealed in other fields during the works and he addressed his thanks to the Commission and to all those who contributed to the success of the seminary.

5th part : ENCLOSURES

1. Participants' list

2. Composition of the work-groups

3. References to work-documents

4. Mandate given to the work-groups

5. Operational repertory of professions and uses

6. Development procedure of an educational programme.

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Mr. Herbert SCHMIDT (Rapporteur Phase B)	Verantwortliche Mitwirkung an der Konzipierung des 2. Datenverarbeitungsprogramms der Bundesregierung	Bundesministerium für Arbeit und Sozialordnung
		53 BONN/DUISDORF (Deutschland) Bonner Str. 85
Mr. Graham TAVINOR	Deputy Director	East Midlands Engineering Employers Association
		Barleythorpe Oakham LEICESTERSHIRE (Great Britain)

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Mr. Gérard THOMAS (Rapporteur Phase A)	Responsable d'option	Association pour la Formation Professionnelle des Adultes
		Le Closeau – Rue Marc Seguin 94000 CRETEIL (France)
Mr. Jamm VAN OERS	Afdelingschef van de Centraal Opleidingskundige Dienst bij Philips	N.V. PHILIPS Gloeilampenfabrieken
		EINDHOVEN (Nederland)
Mr. Edgar WILLE (Rapporteur Phase B - Rapporteur Group 2)	Head of Recrutment training and information, computer power	Computer Power Training School
		CANNOCK, Staffs. (Great Britain)

Officials belonging to E.C. Commission

Mr. RIFFLET (Rapporteur Phase A)	Directeur Général adjoint des Affaires Sociales
Mr. LAYTON (Rapporteur Phase A)	Directeur à la Direction Générale des Affaires Industrielles et Technologiques
Mr. TOFFANIN (Président du séminaire)	Conseiller Principal à la Direction Générale des Affaires Sociales
Mr. DESFOSSES	Administrateur Principal à la Direction Générale des Affaires Industrielles et Technologiques
Mr. LARKIN	Administrateur à la Direction Générale des Affaires Sociales
Mr. WILSON	Administrateur à la Direction Générale des Affaires Sociales
Mme RIALAN	Assistant Principal à la Direction Générale des Affaires Sociales

COMPOSITION OF THE PROJECT-GROUPS

Group 1
(French
speaking)

F

Messrs BALLEREAU   CLEMMETT
     BAUMGARTNER   COEN
     BLACKBURN   LAVAL
     * BORNES   LEBLEVENNEC
     BYRNE   SAINT AMAND
     CERI   THOMAS

Group 2
(German-English-French
with interpreters)

Messrs ARNU   LIVINGSTON
     BARDI   RAO
     BUISSON   SCHMÄDECKE
     COMHAIRE   SCHMIDT
     DE SMET   TAVINOR
     GERMANN   VAN OERS
     KJELDSEN   * WILLE

Group 3
(English
speaking)

E

Messrs BIRD   MORRIS
     CROISDALE   NAHOLD
     EPPELLE   PANIZZI
     GILDE   PAUL
     * GRIFFITHS   PETERSEN
     NAESBORG

* Speakers

WORK-DOCUMENTS – LIST OF REFERENCES

1) **Had been developed prior to the seminary :**

— Presentation of the programme

— Content analyses, Phase A and B

A – Basic documents	Rapporteurs
— The Social European Fund, an instrument in the service of the profession and education	Mr. RIFFLET
— For an EC-policy in data processing	Mr. LAYTON
— Preparatory documents for the seminary, developed or put at the Commission's disposal by : Messrs ARNU, BLACKBURN, BOMAN, COEN, MORRIS, PANIZZI, PETERSEN, VITA (Ancifap), WILLE, OLIVETTI Company belonging to the German and French delegations, the French study-and research centre for qualifications	
— The impact of data processing – the conditions in one country. the German Federal Republic	Mr. SCHMIDT
— Data processing training in Denmark	Mr. BOMAN
— The impact of data processing in the organisation systems	Mr. PANIZZI
— The social consequences of the presence of the computer	Mr. COMHAIRE
— The personnel training to management, operation and use of the computer	Mr. GRIFFITHS
— Adult training in data processing	Mr. CROISDALE
— The essence of data processing training and the responsibilities in this field	Mr. BLACKBURN
— Information and training of data processing personnel – Needs and realisations	Mr. EPPELE
— Specific tasks in the training and permanent education for managers	Mr. SCHMAEDECKE
— The problem of educating the educators	Mr. BYRNE

B – Training experiments

— The OLIVETTI experience in the field of data processing training	Mr. BARDI

— Training problems raised by the introduction of data processing in a big store-house — Mr. HENNEMUTH

— A pilot-experiment on data processing training in 15 plants — Mr. WILLE

— The education of computer-specialists — Mr. MORRIS

— Data processing training as an answer to market-requests — Mr. THOMAS

— ONEM training for adults/University of Louvain — Mr. DE SMET

2) **Documents elaborated in the course of the seminary**

— Flow-chart of a training action — Mr. FOTRE

— Aspect of the seminary — Mr. FOTRE

— Reports of the discussion-groups — Messrs SCHMIDT
THOMAS
GRIFFITHS

— Mandate given to the project-groups (see encl. 4) — Mr. FOTRE

— Reports of the project-groups — Messrs BORNES
WILLE
GRIFFITHS

)

MANDATE GIVEN TO THE WORK-GROUPS

1. **General mandate :**
   (substrate)

   Develop on the base of information collected by the seminary (Basi
   data–Phase A, training trials–Phase B, discussions and participant:
   contributions),

   an « *integrated project* » *for training the personnel* —

   (data processing specialists), direct and indirect users, environment
   apt to give a coherent answer to the problems raised by the introductio.
   or the development of data processing systems.

2. **Objectives :**

   — identification and definition of the problems raised by the develop
   ment of this project ;

   — detection of orientations for training policies and methodologica
   elements aiming at the development and adaptation of the trainin
   system ;

   — definition of the intervention fields, of the methods and media fo
   the subsequent action to be started at various levels (organisatior
   nation, European Community).

3. **Specific problems and objectives**

   Group 1 – Design of a training policy

   a) Study of the interfaces and interactions between the data processin
   system and the environment, study of the problems raised in th
   scientific, technological, economic, social and cultural fields.

   b) Definition of the training/information needs.

   c) Definition of an information and training policy apt to meet thes
   needs : the ends and the means.

   Group 2 – Educational methodology

   Starting from a total conception of training in data processing stud
   the methodological problems (what is to be done – how should it b
   done) for the educational system, for instance :

   a) How should a given situation be analysed ?
      — fields, aspects, factors to be considered
      — methods and instruments for analysis
      — operators, participation of the environment, of the persons
        be trained...

b) How should the training problems and needs be identified, defined and formulated ?
   — fields, aspects, factors to be considered
   — methods and instruments for analysis
   — operators, participation of the environment, of the persons to be trained...

c) How should the training objectives be defined ?
   — fields, aspects, factors to be considered
   — methods and instruments for analysis
   — operators, participation of the environment, of the persons to be trained...

d)

e)   etc

Group 3 – Specific training actions

Starting from a total conception of training in data processing, study the specific actions apt to meet the needs of the various population groups.

a) Selection and definition of the target-groups

b) Analysis of the needs and definition of the objectives

c) Planning of the training actions
   — contents and methods
   — training/trainers structures
   — common subjects and specific actions.

4. **Work-documents :**

   — Reporters' contributions.
   — Analysis of the content and problems inventory.
   — Flow-Chart of a training action.

OPERATIONAL REPERTORY OF EMPLOYMENT REQUESTS (R.O.M.E

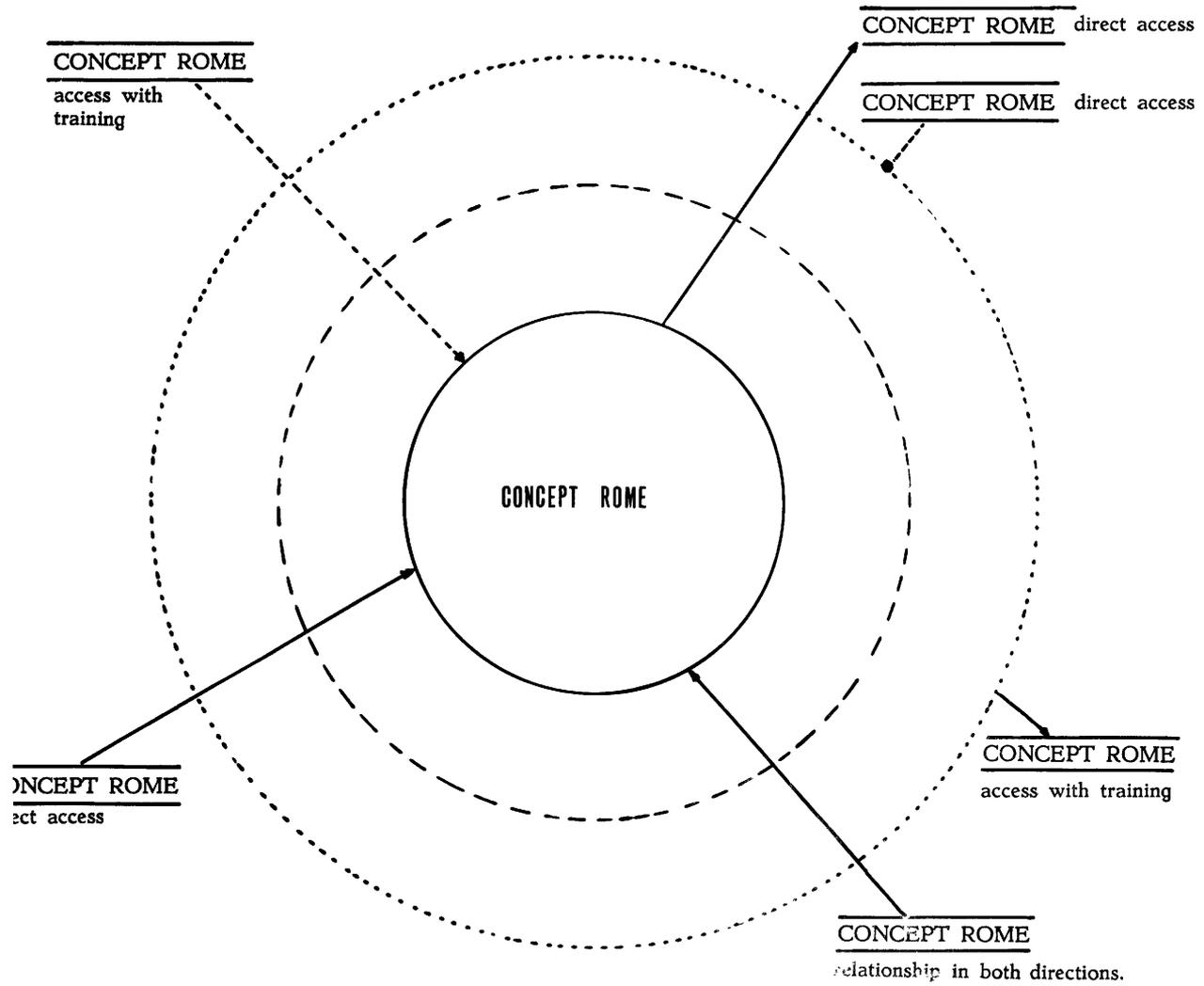*Professional sector : INFORMATION PROCESSING*

OBJECTIVES :

- Define the bases of a COMMON LANGUAGE between A.N.P.E. and the users in the departments, the emplo
ment applicants and the employers.

- Facilitate the RELATIONSHIP between offers and requests and broaden them :
  — by grouping the jobs in professional families
  — by evidencing the relationship between professional families.

THE MEDIA :

- **An alphabetical synopsis.** It mentions the facts contained in the characteristic cards and refers back to them.

- **« Characteristic cards ».** Each card :
  — IDENTIFIES A JOB (concept R.O.M.E.) mentioning namely :

- the applicant's work, where and how

- the general practical conditions

- the qualification levels in the activity sector
  — SITUATES THIS JOB in a professional family including :

- SYNONYMS allowing an immediate comparison

- SPECIALTIES allowing a comparison at cost of an adaptation

- jobs allowing a comparison if the applicant has a FAIR PROFESSIONAL EXPERIENCE
and a high QUALIFICATION in the concerned professional family.
The family is visualized in the following form :

Qualifications (always mentioned)

CONCEPT ROME

Specialties (sometimes mentioned)

Synonyms (not mentioned)

52
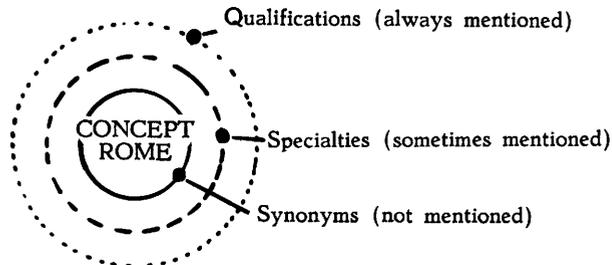
— EVIDENCES the relationship between the jobs and the various professional families, the arrows indicating the direction of this relationship and possibly the necessity of an additional training.

CONCEPT ROME direct access

CONCEPT ROME direct access

CONCEPT ROME
access with
training

CONCEPT ROME

CONCEPT ROME
)NCEPT ROME
ect access

CONCEPT ROME
access with training

CONCEPT ROME
relationship in both directions.

LIST OF CHARACTERISTICAL CARDS

———

Filing according to code R.O.M.E. (experimental)

Codification			Mention on the characteristic card
R.O.M.E.		List of the jobs	
Series	Card-number		
35	01	621	APPLICATION PROGRAMMER
35	02	621	STUDY PROGRAMMER
35	03	621	SYSTEM PROGRAMMER
35	04	620	ORGAN ANALYST
35	05	620	FUNCTION ANALYST
35	06	207	SYSTEM ENGINEER
35	07	217	HEAD OF DATA PROCESSING PROJECT
35	08	624	PUNCH CONTROLLER
35	09	622	COMPUTER OPERATOR
35	10	622	DESK OPERATOR
35	11	620	WORK DESIGNER (DATA PROCESSING)
35	12	217	HEAD OF OPERATIONS (DATA PROCESSING)
35	13	620	HEAD OF DATA PROCESSING SERVICE
35	14	227	MAINTENANCE TECHNICIAN (DATA PROCESSING)
35	15	207	TECHNICAL COMMERCIAL ENGINEER (DATA PROCESSING)

OPERATIONAL REPERTORY OF PROFESSIONS AND JOBS

APPLICATION PROGRAMMER	**35.01** ROME (experimental)
	76.94 AI
	621 NE

Preliminary project

:NTIFICATION OF THE JOB

Starting from the technical files set up by the analyst and the study programmer, the operational sequences foreseen (in the form of instructions-programmes), which are understood by the computer, are translated. These programmes are tried and perfected.

NONYMS

nexperienced programmer

:oder (programmation)

NOT TO BE MISTAKEN

Study programmer

System programmer

ECIALTIES

According to the type of language :

COBOL programmer
PL-I programmer
FORTRAN programmer
ALGOL programmer, etc...

QUALIFICATIONS

Employee

TYPES OF EDUCATION

College degree H
Capacity certificate to data processing
Professional certificate data processing
AFPA training, training by manufacturers, special institutions and plants
Knowledge of English appreciated

IERAL CONDITIONS OF PRACTISE AND APTITUDE

Vork to be performed in a study service under the direction of a team leader, requiring : logical thinking, understand-ng, feeling for details, patience, discipline, method, team spirit.

COUNTER-INDICATIONS

SEE ALSO :

A.N.P.E.

Study programmer :

Card 35.02

Work-designer (data processing
1st stage

Work-designer data processir
card 35.11

Desk-operator

Card 35.10

APPLICATION

PROGRAMMER

Computer operator

Card 35.09

CAPTION

(————Nucleic name
(------ Specialties
(············Job necessitating good qualifications
and experience

————▷ Job is accessible with adaptation

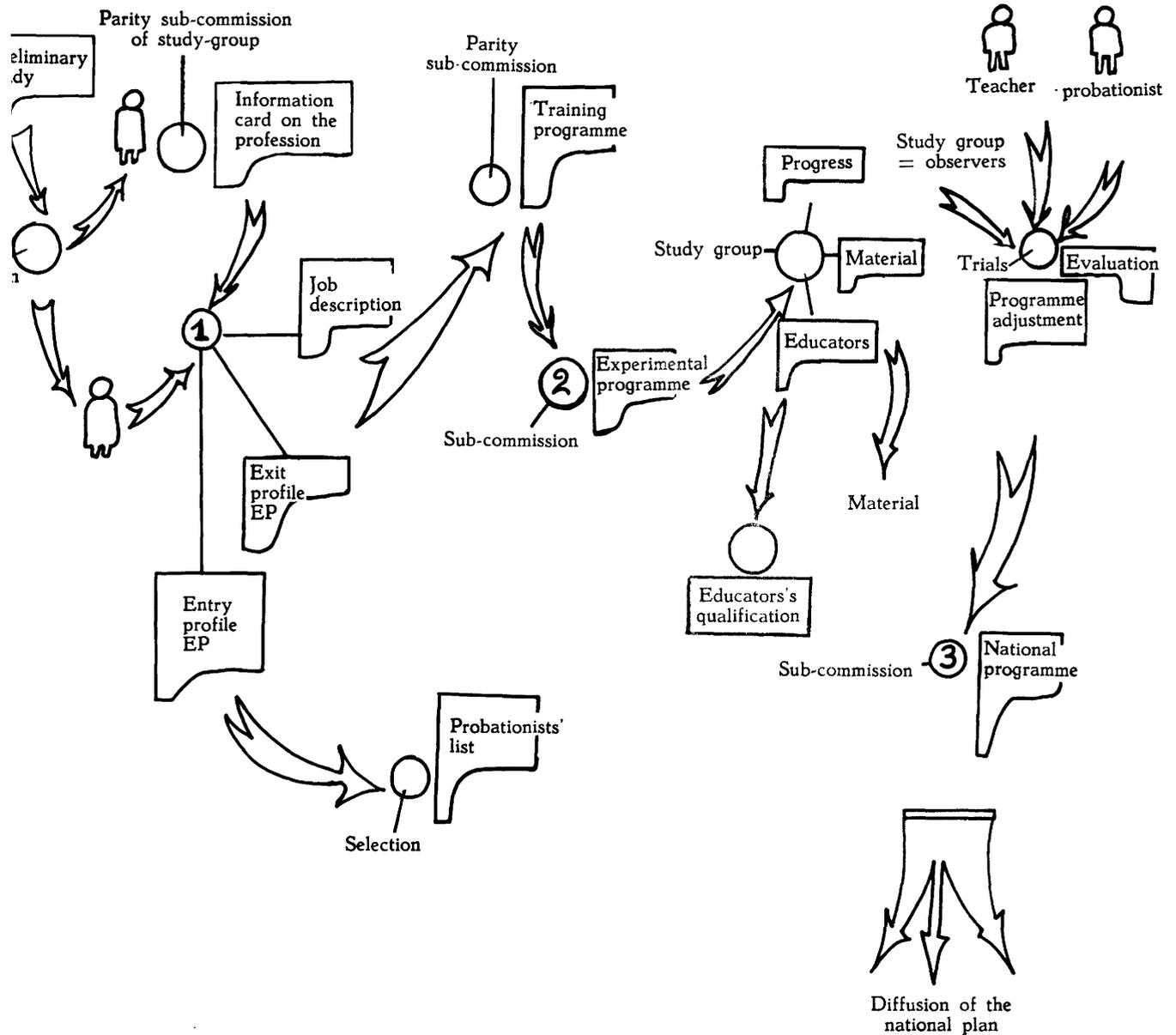······▷ Job is accessible with additional training
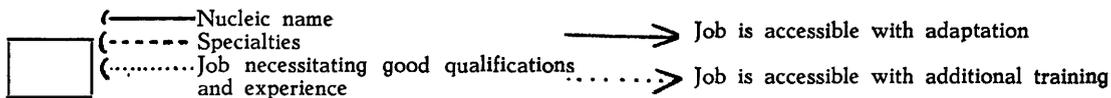
TYPES OF CONCERNED ORGANISATIONS

Computer, manufacturers, service companies, all companies using data processing

DEVELOPMENT PROCEDURE OF AN EDUCATIONAL PROJECT
(A.F.P.A. – France)

Parity sub-commission
of study-group

eliminary
.dy

Information
card on the
profession

Parity
sub-commission

Training
programme

Job
description

1

Exit
profile
EP

2

Experimental
programme

Sub-commission

Entry
profile
EP

Probationists'
list

Selection

Teacher · probationist

Study group
= observers

Progress

Study group

Material

Trials   Evaluation

Programme
adjustment

Educators

Material

Educators's
qualification

Sub-commission 3 National
programme

Diffusion of the
national plan

DEVELOPMENT PROCEDURE OF AN EDUCATIONAL PROJECT
(A.F.P.A. – France)

1 – REQUEST FOR A NEW TRAINING

To launch a new training for a profession, which never had been taught at A.F.P.A. (
was the case for programmers and analysts) the procedure had to be started:

      1) either at a local level, by a departmental commission (D.D.T.M.O.)

      2) or by the sponsoring ministry (Ministry for Work and Employment)

      3) or by a National Commission (national need)

      4) or by the Employers' or Workers' Unions.

Every request is the statement of the fact that some field of professional training is
adequately covered by the existing educational means.

This was evidenced for data processing training by a Study Commission on the data process
needs, meeting on the occasion of the elaboration of the 6th plan, and to which an A.F.F
delegation participated.

Accurate objectives have been fixed following:

      — the listing of jobs performed by data processors

      — the description of the tasks in data processing

      — the appreciation of the incidence due to the growing number of computers

      — the comparison between the new qualification needs and the resources of
        educational system.

For data processing the request was initiated by the Ministry. Starting from such requests
technical A.F.P.A. body informed the adequate National Parity Professional Commiss
which in turn could appoint a specialised national sub-commission. A responsible teac
had then to perform the study.

2 – A.F.P.A. STUDY

Investigations and preliminary works were then performed in view of collecting data concern
the technical content of the considered profession and of setting-up a professional monograr

The parity sub-commission, composed of professional specialists had then to examine
monography and possibly improve it.

As the monography usually covers the entire profession,

      — the exit profiles,

      — the individual entry profiles

had to be selected.

The methodological conversion of the programme content, of the technical and behavioural requirements (allowing self-evolution for the probationist) of the considered profession was then performed These data were converted in tables which were used as basic documents for the application of the programme.

As the programme was designed in function of what the probationist must **be able to do,** a new concertation then took place with the professionals in view of perfecting the programme.

Would the programme be considered to be realisable, reckoning with the probationist's entry profile, the psycho-technical service might then perform a first engaging, through the intermediary of a selection commission and by applying appropriate tests.

At this stage of the procedure, lists of equipment and materials as well as installation drafts of work-shops and rooms were set-up.

Starting from the programme, the study group proceeded to a time division for the various courses, designed exercises and practical proofs in conformity with the best ajusted pedagogic spirit.

The study group then proposed the progress to the sub-commission prior to going over to the experimental phase.

The teachers, who have to teach the new training, will receive the proper pedagogic education before being taken in charge by the study group.

3 – TRIALS

The progress was then tried and appreciated by the A.F.P.A. technical services.
At fixed periods **evaluations** were performed namely with regard to : the results obtained by the probationists, the difficulties which were experienced, the time spent on each exercise, the equipment used, etc.

At this stage and upon the base of the collected data, the specialised national sub-commission proposed final modifications for the programme and appointed the training period.

The training might then be generalised in the A.F.P.A. centres designated to this effect.

At fixed intervals and within the frame of educational maintenance, new evaluations will be performed.