

**INNOVATION**

**IN TRAINING**

# **Report on European Workshop at Blenheim, Oxford, November 1990**

**Barry Nyhan**

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# INTRODUCTION

EUROTECNET is a European Community Human Resource Development Programme. The aim of EUROTECNET is to promote innovation in training to respond to technological change and the impact which this is having on the organisation of work, and the new competencies required by the workforce.

The innovation process in technology is moving at an enormously fast pace. Producers of technology such as computer companies and software houses are increasing the quantity and quality of their products and their applicability to business goals.

When compared with technological advances it is clear that the organisational and human resource innovations, required to complement the technological ones are not taking place at the same pace. A need to innovate at the level of competence development therefore exists.

The workshop on "Innovation in Training" which took place in Blenheim near Oxford on 27-29 November 1990 sought to gather ideas and information on innovative trends in the field of vocational training in Europe and to discuss the long term impact which these trends will have on training systems and practices.

The workshop sought to identify the kinds of innovations which could take place in the realm of vocational training over the next ten years, and look at ways in which these innovations could be fostered. This enables EUROTECNET to concentrate on specific targets in a European context. It also contributes to an understanding of the notion of the innovation process itself.

The workshop had two specific objectives:

- firstly to identify **goals related to Innovation in Training**, to aim at over the next ten years;
- secondly to outline the **Strategies which can be used to attain these goals**.

Nineteen participants from different European countries representing a wide variety of training interests took part in the workshop. They are listed in Annex Three. In preparation for the workshop participants were asked to prepare a short written one page paper on an innovation topic (step) according to the following guidelines:

## STEP 1

### **The WORK PLACE**

Forecasting the work place of the future is needed. What are the professional profiles of the future, the required qualifications; how to identify changes in this field?

## STEP 2

### **The POLICY IMPLEMENTATION**

It's easy to know what to do; more difficult to transfer that knowledge to the decision makers and influence their actions. How does one innovate in the installation of new training policies?

## STEP 3

### **The TECHNOLOGICAL CHANGE**

In spite of the rapid developments of the last ten years, the technological revolution continues; how does one preview technological advances and translate these into training actions?

## STEP 4

### **The TRAINERS**

The rôle of teachers and trainers will change. Their own training must be adapted. What kind of innovation should be promoted in this field?

## STEP 5

### **The TRAINING METHODS**

They will be transformed through the impact of technology. Pedagogy, adult training, CBT, self-learning approaches, the rôle of the schools, learning at the work place, will all require innovative changes.

## STEP 6

### **The MARGINAL GROUPS**

New actions will be required in favour of the disadvantaged groups in society, who cannot profit from formal and open training systems. How does one innovate in that field, what kind of new compensatory training can be conceived and implemented?

## STEP 7

### **The EUROPEAN COMMUNITY'S RESPONSIBILITY**

The larger rôle played by the Community in fostering change in training systems must be seen as an innovatory factor affecting all of Europe. Will this lead to innovatory forms of power sharing, and/or of financing?

## STEP 8

### **The ENTERPRISES**

They are likely to become more involved in developing their own training activities, and therefore in influencing national systems. How far will they go in assuming special responsibility in the field? How innovative will they be in practice?

## STEP 9

### **The ACCESS TO TRAINING**

Will the increasing demand for qualifications and training foster further democratisation, or will we witness a new form of elitism? What impact will this have on the labour market and on the relative social status of occupations?

## STEP 10

### **The ALTERNATIVE DREAM**

Each of us perhaps envisages a more radical innovative step, which is not included in the previous nine steps. What is this alternative step?

*A copy of the written presentations by the participants in response to these ten steps can be found in Annex 2.*

The workshop opened with a series of presentations by G. Fragnière (EUROTECNET Technical Assistance Office), O. Bertrand, Centre d'Etudes et de Recherches sur les Qualifications (CEREQ, Paris) and an introduction to the workshop structures and methodology by B. Nyhan (EUROTECNET Technical Assistance Office). The remainder of the workshop comprised alternating small group and plenary sessions. In the final day a synthesis of the main issues which arose were presented and the main aims and activities of the EUROTECNET Programme were outlined by J. Horgan, Coordinator General, EUROTECNET Technical Assistance Office.

# PART ONE

## Opening Presentations

In the opening speech Mr. Gabriel Fragnière reflected on a major European educational report entitled "Education without Frontiers", which he had edited 15 years ago.

He pointed out that that report did not have the innovative impact which the authors had expected it would have. Two reasons why this was so were put forward:

1. At that time innovation was primarily seen in terms of developments within the existing structures. It was not foreseen that the educational system was going to block itself. As it transpired change occurred due to the influence of "actors" outside of the main-stream educational system.
2. The authors of the report did not fully appreciate the rôle played by "time" in the change process. It is incorrect to see progress in terms of one event having an impact on another event in a sequential logical patterned process. Change often takes place through a variety of simultaneous influences. A systemic multi-dimensional approach rather than a linear approach must be adopted therefore.

Mr. Fragnière outlined two certainties which must be taken into account in examining future innovations in training and education.

- a) Education and training cannot be fully understood today without considering the major rôle being played by the enterprises. In many ways they are taking over educational and training rôles previously held, in historical terms, initially by the Church and subsequently by the State.
- b) The emphasis in further education and training systems will be on learning and not training. This means a "learning society" in which the focus is on the learners' potential to continuously learn to respond to change.

Mr. Olivier Bertrand's paper which is reproduced in full in Annex Two outlined six challenges facing innovators in Vocational Training and Education. These are:

1. As economies to-day are more competitive and demand a higher level of skills in the workforce, what is to become of unqualified workers? This group is going to find it increasingly difficult to find work in the future.
2. Employers feel very strongly that the educational and training systems are not equipping people with *basic* skills. These systems must respond to this demand by ensuring that

young people have the maturity and technical competencies to perform effectively in the workplace, without the need for a long "lead-in" time.

3. In many instances New Technology has caused training systems to give too much importance to the technologies themselves (tools of training) as distinct from the goals of training. What is required is technological training which is focused on economic and business objectives.
4. The Curriculum must become interdisciplinary to respond to the "New" subjects coming into being e.g. mechatronics.
5. Training must aim to make people multifunctional to respond to the changes occurring in industry. Production and selling functions are coming together much more to-day, so people must be competent in both areas. The profile of the supervisor is also changing. He/she must be able to follow a manufacturing process in all its aspects, technical, organisational and financial.
6. To respond to the future needs of training there has to be a great deal of close *collaboration between Public Training/Educational Systems and the Enterprises*. Much of the criticism directed forwards the Educational System is unjust because of the demographic problems and the financial ones which they have to deal with. The long term solution to providing high quality initial training and continuing training is a partnership between "schools" and the "companies".



## PART TWO

### Synthesis of workshop conclusions - Promoting Innovation in Training

The workshop sought to identify *goals* and *strategies* in relation to the promotion of innovation in training systems.

A key question which dominated the workshop discussions was - *what is meant by Innovation in Training ?* Without a common understanding it is easy to go off in many different directions. This synthesis therefore firstly attempts to deal with this question within a conceptual framework before going on to look at goals and strategies.

The term innovation generally tends to be seen in terms of technological innovation. An innovation in training however is predominantly a *social/organisational matter*, which has to do with groups of people, organizations and/or training providers implementing concrete *actions* which respond to to-day's needs. These needs among others are technological, economic and business-related. They relate to the manner in which technology is demanding higher level "knowledge workers". These workers must be multiskilled/polyvalent who are competent in a business, technological, personal and social sense. They must be capable of autonomous actions, either in relation to managing their own personal lives - changing roles, continuously learning, updating skills, **and** in relation to working on their own initiative within an enterprise. They must also be able to cooperate with people from different technical/professional backgrounds-colleagues, customers , managers, etc.

A genius has been described as "someone who can read the sign of the times in the age which he/she is living". Perhaps the same can be said of a training innovator. This person will probably be seen to be out of step with everybody else, because most of us live our lives based on yesterday's trends. The way things happened yesterday becomes a rule for to-day. An innovator however is someone who lives in the *present* with a *firm eye* on the future as well the *past*. He/she looks deeper into the present and so sees the interconnections with the past and the long term future perspectives.

**Innovation in training therefore is about creating soundly based and future oriented training systems which will equip to-day's and tomorrow's employees to effectively perform the tasks/actions in the constantly changing work contexts they find themselves.**

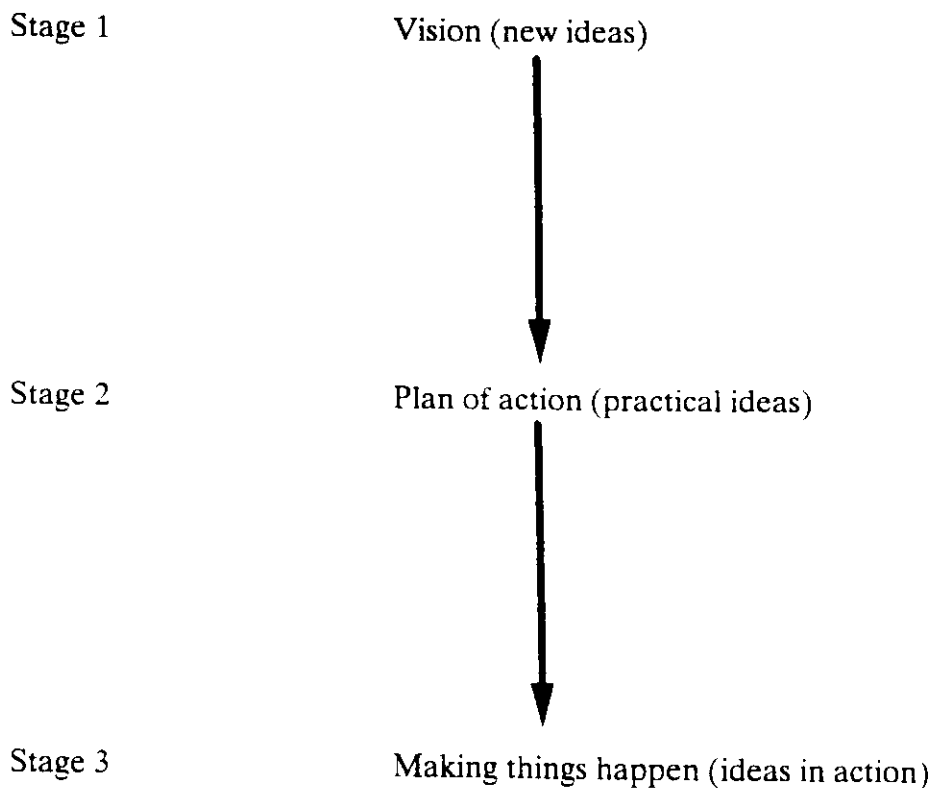
Innovation in training is not the same as futurology (Fragnière) because in forecasting you are not involved in making things happen. Neither is creativity the same as innovation even though it is closely related. To innovate as the Latin name indicates, means "*to make new*". Innovation in training therefore is about translating visions *into actions*, with the emphasis on **making things happen**. Many creative visions/strategies (five year plans, strategic plans) have been put forward by national and sectoral training agencies and enterprises which have come to nothing.

They failed to convert creative concepts into reality. The innovations remained in a mere verbal state -"nice ideas".

The difficult part of innovation in education and training is the implementation stage. This does not mean that it is easy to come up with new ideas. This is the first stage of the innovation process. But normally in our society there is no shortage of good new ideas. The trouble is "breaking through the crusty rigidity and stubborn complacency of the status quo" (John Gardner). While one is allowed to come up with new ideas, one must live according to the old ideas, the way in which things "have always been done". The innovator therefore has to fight hard to push through his/her ideas.

It is the stages two and three of the innovation process which call for "**creativity in action**". A sense of fight and staying power are demanded here. This is the test of the soundness and legitimacy of the vision.

## STAGES IN INNOVATION



"Making things happen" is about bringing about change and not just talking about change - "Actions speak louder than words" - "We are what we do".

Innovation demands hard work. It is not just about a flash of inspiration. This means blood, sweat and tears !

"Making things happen" calls for collaboration and teamwork based on a sharing of responsibilities. This requires dialogue based on a sense of partnership.

Many people are frightened by the very idea of innovation. It conjures up notions of brilliance and super-human inventiveness. An innovatory action however does not have to do with implementing a *brand new idea*. It can mean uniting different ideas in a way that they have not been done before.

In a training context this could mean bringing together bodies which normally tend to operate according to different culture values, to work together on a common project e.g. a private Enterprise and a Training/Educational Institute.

Going further, linking the two processes in the workplace, normally seen as separate, such as learning and working is another example of innovation in practice.

From another point of view an innovation can be the implementation of an "old" idea in a "new" way or the application of an "old" idea to a "new" problem. An innovator is someone who has the ability to *make connections* between different fields of human activity. He/she sees *relationships* and *applications* where other do not. For example many trainers to-day are recognising that the "ancient" Socratic teaching method can be one of the ways of restructuring the learning process so as people can acquire the capacity to think for themselves, and deal with a modern world dominated by turbulent change. These innovators are not put off by criticisms which imply that they are not coming up with anything new. They are confident in the fact that they are responding to a need in their times with an effective solution. Their primary concern is to "make something new *happen*" in the field in which they have responsibility.

Innovation must also be related to the context in which one is living. What is a small step for one person may be an enormous step for another. Any evaluation of innovation therefore must start with an examination of where one is coming from. It is critical that people approach innovation as a stepping stone process, starting with a correct analysis of the present situation.

Another misconception about the notion of innovation is that it is sometimes equated with trendiness or *novelty*. Marketing strategies often work on the basis of promoting *the flavour of the month*. A product is "innovatory" this month but next month it is out of date. The hyped message going alongside this strategy is that the latest model will provide an instant solution to all "your problems", while last month's model is useless. This "cult of the new" for its own sake has affected the training world. Training packages and approaches are put forward as the latest discovery which will solve all training problems. In many cases they are nothing more

than glossy half-baked approaches. Innovation in training is not concerned with promoting instant, facile solutions, but rather building foundations, establishing infrastructures systems and organisations which will have a worthwhile and long-term impact on the development of people's competencies.

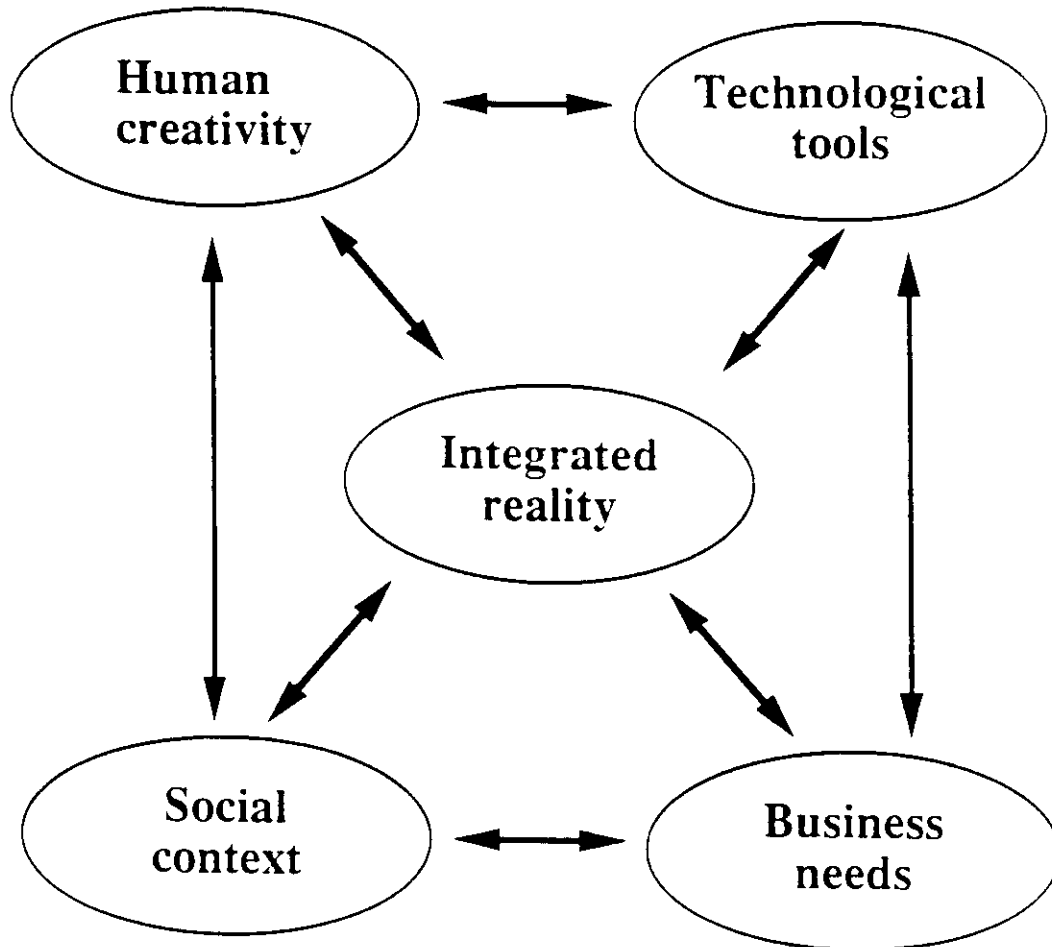
### **Goals related to Innovation in Training**

The overriding goal which training systems should strive to aim at over the next number of years is that of promoting an *integrated all-round* type workforce. In relation to technological training this means focusing clearly on the "end result" of training rather than on the tools of training. In "Bureautiques"/Office Technology Training for example the emphasis in some countries has been too much on mastering the software and techniques without giving people general business and economic competencies (Olivier Bertrand). This has meant an over concentration on the tools themselves rather than on the goals. In training one must learn *to apply* technological tools to solve business, technological and social problems in the work place.

The issue of integration is not just on the level of the individual. An integration of functions must also take place at the level of the organisation of the Training Institute and the Enterprise. The Tayloristic atomisation of functions into a dehumanised series of routine jobs must also cease. The integration which, for example, the modern computer integrated manufacturing software presupposes, requires that traditionally separated functions like production, sales and accounting must connect much closely together. Similarly the Tayloristic-like division of the school curriculum into discrete, (and sometimes even opposing technical-humanities), subjects is supporting the notion of a fragmented picture of life.

The training innovation which is demanded in "our times" is the integration of four dimensions, outlined in the diagram overleaf. The modern "knowledge workers" in a progressive and a competitive society must possess these in a holistic manner. Similarly the modern training and business organizations must operate according to this model if people's potential is to be harnessed to continuously learn new technologies to achieve business goals.

# FOUR GOALS OF INNOVATIVE TRAINING

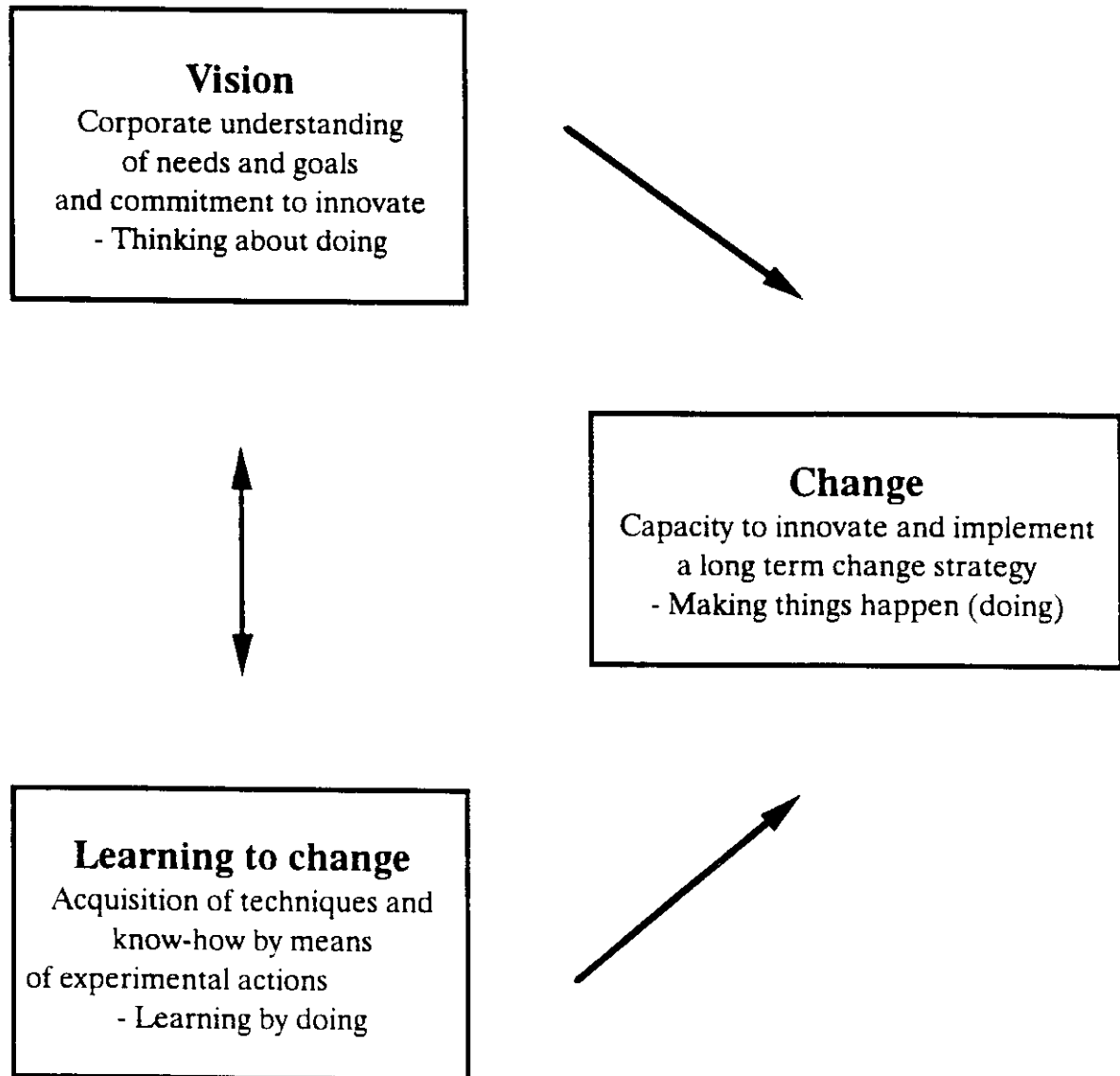


## Strategies to implement Innovation

In the final analysis innovation is about *implementing* and achieving goals. It is about *doing*. This is the difficult bit. Even though the integrated goal outlined above is ambitious there is no reason why it cannot be attained if it is seen to be important enough. Recent research has shown the limitations of the technologically determined view of training. The view now emerging is one which states that the manner in which technology is used is the subject of organizational choice.

An innovation process to achieve long term policy goals must start with a two pronged attack from the top and the bottom of the training organization/system as depicted in the diagram in the next page. It begins at the top with a concentrated effort to understand and make commitments to long term innovation goals. Simultaneously at the bottom finely tuned techniques and know how must be acquired by means of experimentation.

# INNOVATION PROCESS



Some of main strategies (pressure points) to foster innovation in training systems at a national and a European level outlined during the course of the workshop are listed below.

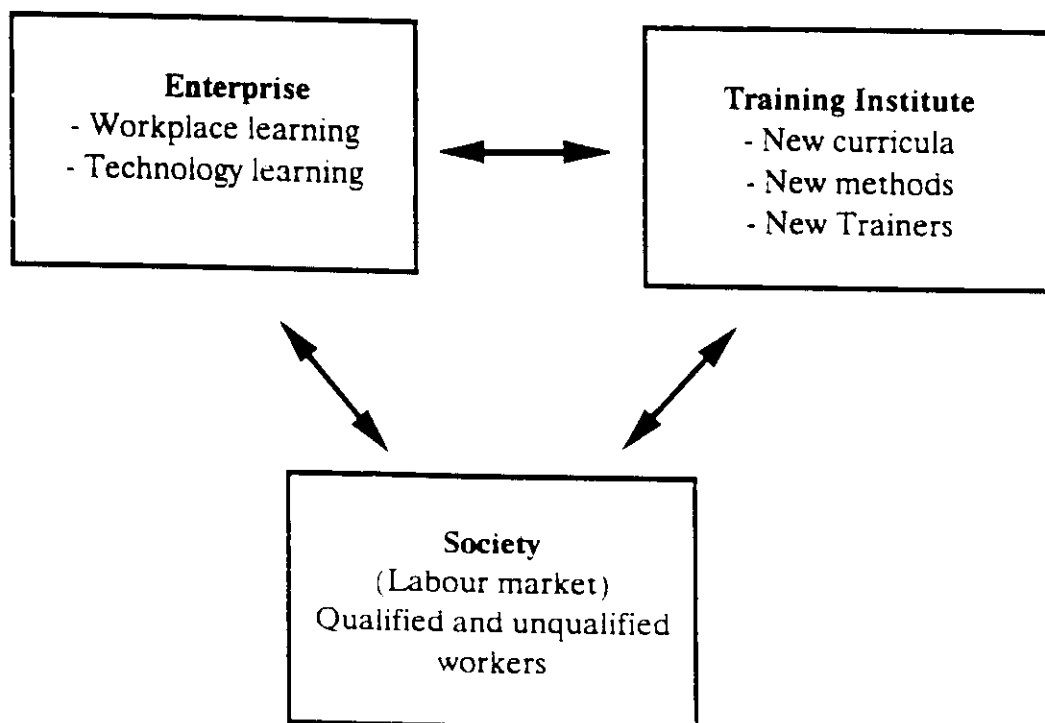
(1) *Partnership between Enterprises and National Training/Educational Bodies and Institutes.*

The partnership notion was the dominant theme throughout the Blenheim workshop. It was seen to be the only way to resolve the "training market" issue. Initiatives on a micro and a macro level which deal with Education/Training Institute - Enterprise partnerships and social partnership were seen to be essential for the promotion of innovations which respond to present European needs.

Because of continuous technological changes, Enterprises, in the interest of their own survival, must play a major role in training. Enterprises have to learn by doing through responding to daily changes in the market-place, technology and the consequent effects on the way in which work has to be organised. Enterprises however do not tend to see their roles in terms of long-term learning. On the other hand Training and Education systems are happier taking the long-term view - the problem however is that they often tend to be closed systems insulated against change. Their long term view therefore tends to be a rather static one. Their curricula also tend to be rather fragmented, bound up with specialised disciplines rather than the interdisciplinary and integrated which is demanded by the external environment.

The key to the resolution of this problem is the partnership model in which the Enterprise and the Training Bodies work closely together in implementing a shared global strategy, which does not overlook the question of the unqualified members of society who are less able in the knowledge intensive age, to find a job.

## PARTNERSHIP MODEL



(2) *New role for Trainers - Change agents/learning animators*

One of the other key innovations demanded in training, over the next number of years, identified by participants at the workshop, had to do with the profile of the trainer. The "mind set" of the traditional trainer has to do with the transmission of pre-packaged skills and knowledge in a training environment which is resistant to change. The traditional trainer is often locked into a conservative (vested-interest) specialist subject matter role. The new trainer must be a pioneer of change who is open to all aspects of the work-social-technological environment.

He/she must ensure that training does not become an inward-looking profession which is concerned only with its own internal aims. The purpose of training is to serve the needs of the whole of society - economic and social.

Training Institutes therefore must have a clear focus on the goals of training and not just train people for the sake of training. The management role in training therefore in relation to setting goals, monitoring and evaluating progress and results is of critical importance. Managers of training systems need to play a major role in consulting with and guiding their trainers to address the goals of technological change, so as they in turn can animate/facilitate their trainees to take responsibility for developing competencies such as initiative, flexibility and polyvalence.

(3) *New Learning Methodology - Self-Learning as a solution to the permanent learning problem.*

The development work undertaken by EUROTECNET on Self-Learning Competency which stresses the need for the modern workforce to possess the ability to learn for themselves as individuals and in work groups, was acknowledged by participants to be very fundamental to the innovation process.

Training systems both in Training Institutes and Enterprises must place the emphasis on learning rather than training. The focus being on the learning person (the customer) rather than on the trainer/teacher. Training therefore must be participative and interactive. This is particularly relevant for technology based/multimedia systems which of their nature tend to be "one-way-communication" oriented.

In the training institutes much greater emphasis must be placed on group based problem solving/project based learning. This will enable the young trainees to acquire the "transferable skills" demanded by employers which in most systems are not formally listed in the curriculum such as self-learning ability, cooperation, problem solving, etc.

(4) *New place of Learning*

The point made about the new place of learning is closely related to the previous one about the need for a self-learning methodology. In an age of constant development in a technological and training sense, the enterprises will have a major rôle to play in continuing training. Learning must take place at work.

The concept of the self-learning enterprise/company (or the self-qualifying enterprise) must become a reality.



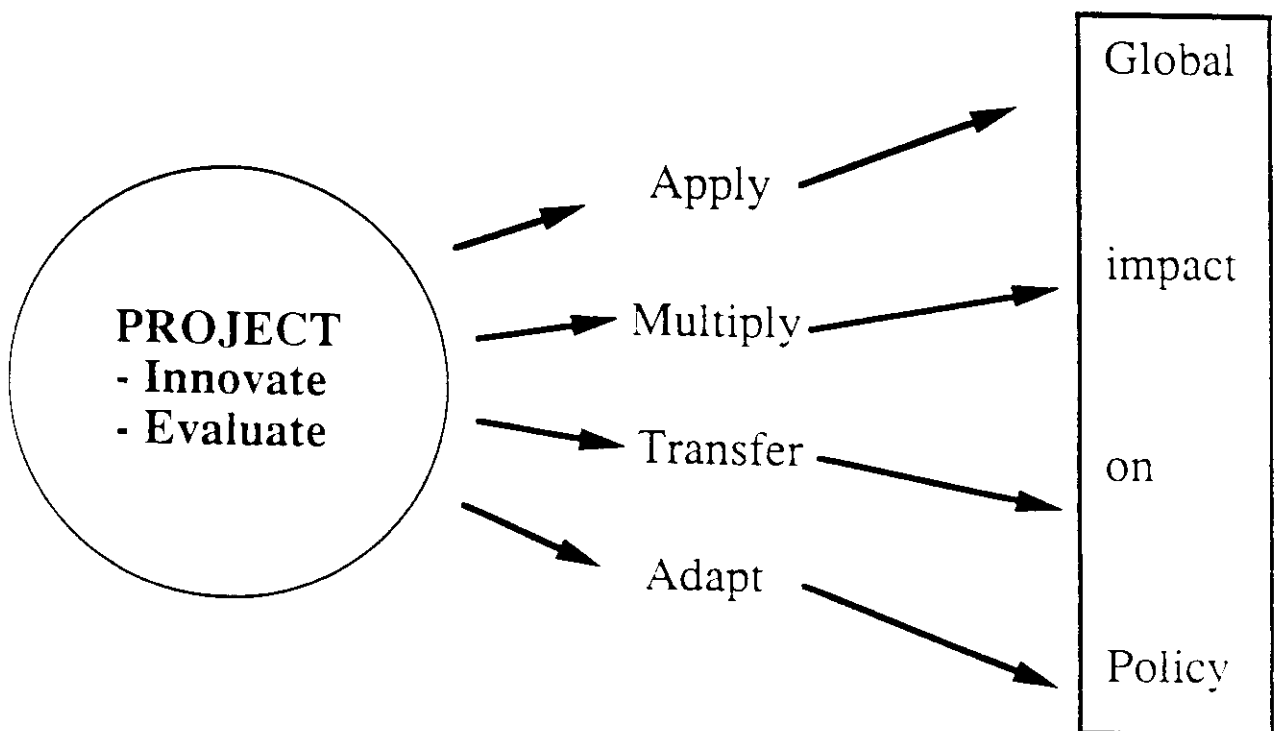
(5) *Training / Learning within SMEs*

The realisation of the idea of the self-learning enterprise faces its real test when confronting the problem of continuing training within SMEs. This was seen as one of the most difficult and urgent challenges facing European training systems. SMEs employ the greatest majority of the workforce in Europe and consequently are the "hidden" driving forces for economic development and social progress. It was pointed out at the workshop that many of the initiatives attempted in relation to training in SMEs have failed, so new imaginative and well targeted approaches are required.

In future initiatives in this regard the notion of partnership between public training bodies and SMEs, and SMEs forming consortia among themselves, was seen as one of the ways forward.

**Final Point**

EUROTECNET is concerned with stimulating innovative experiments which will generate the development of innovative policies at Member State and European levels. This is depicted in the diagram below.



Global changes begin with a series of small steps, sometimes taken against a background of external economic/social and time pressure, while at the same time also driven by the internal creative urge and self-determination to build a better world. The network of creative actions in EUROTECNET gives all of those involved the opportunity to work in their own projects, and together with other projects, to ensure what needs to be done is done. The motto guiding this surge of activity being - "think globally, act locally".

**ANNEX ONE**

**WORKSHOP PROGRAMME**



## WORKSHOP PROGRAMME

First day: 16.30 - 19.00 (plenary)

### **What is Innovation in Training? Experiences and perspectives**

Gabriel FRAGNIERE

**"Education without Frontiers" revisited !**

Fifteen years after editing the synthesis of the European Cultural Foundation project "Education in the XXIst Century", the editor of the final report looks at achievements and shortcomings in forecasting educational changes.

Olivier BERTRAND

**Innovation in Training and Innovation in Technology**

Interaction, interdependence, common approaches, policies

Discussion

Barry NYHAN

**Pointers for a creative Workshop:**

Introducing the sessions of the following day

Presentation of the contributions of the participants

Second day: Session 1 in the Morning; Session 2 in the afternoon.  
(*alternating plenary exchanges and small group discussions*)

**The basis for these sessions will be contributions of the participants themselves, i.e. ONE PAGE maximum, on only ONE of the TEN STEPS proposed below. These contributions will be grouped according to themes and perspectives.**

Session 1 : **Visions of the Future - Where are we going?  
Ten Goals to aim at !**

Issues and perspectives.

Session 2 : **How do we get there?**

What are the policies and concrete actions needed to achieve our goals?

Models, policies, actors and instruments. Our present action in view of long term perspectives.

Third day: 09.00 - 12.00 (Plenary)

**Synthesis**

animated by Barry NYHAN and Gabriel FRAGNIERE

How could EUROTECNET activities foster change?

**The rôle of the Community and its programmes in fostering changes in training in Europe**

## **ANNEX TWO**

### **PAPERS PRESENTED BY PARTICIPANTS**



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Le

Affaire suivie par :

**INNOVATIONS TECHNOLOGIQUES  
ET TRANSFORMATION DU TRAVAIL  
DÉFIS POUR LA FORMATION**

*Contribution à la réunion Eurotecnet  
sur la promotion de l'innovation dans la formation,  
Oxford, 27 Novembre 1990*

Olivier BERTRAND

Novembre 1990

La littérature sur le thème des conséquences de l'évolution technique est déjà si abondante qu'il est bien difficile d'éviter les redondances et les banalités. Pour tenter d'y échapper, on peut tout au plus remarquer qu'une partie de cette littérature a un caractère excessivement général, tandis qu'une autre est au contraire si spécifique (études portant sur un seul cas) qu'il est difficile d'en tirer des conclusions. C'est pourquoi cette contribution débute par quelques remarques mettant l'accent sur les différences et sur les distinctions, avant de suggérer quelques idées générales, en forme de défi aux systèmes de formation.

## REMARQUES PRÉLIMINAIRES

### Quelles technologies ?

Le discours actuel sur la technologie est très axé sur les nouvelles technologies de l'information. Mais peut-on encore dire qu'elles soient nouvelles ? Et comment prendre en compte les autres technologies ? Certes, il y a des travaux qui ont entrepris de passer en revue la gamme très large des autres technologies. Mais les a-t-on considérées du point de vue qualification et formation ? La variété des situations serait très grande, depuis les bio-technologies, (impliquant la juxtaposition des méthodes industrielles de production et des compétences en biologie) aux nouvelles technologies de conservation des produits alimentaires, (supposant une remontée au stade industriel des qualifications situées jusqu'ici dans la distribution) ou aux matériaux composites (dont l'utilisation entraîne le remplacement des techniques modernes d'usinage par des procédés d'assemblage très artisanaux).

### Produits et procédés

Si l'on en reste aux technologies de l'information, il faudrait établir une distinction importante entre leur impact sur les produits et sur les procédés de production, encore que cette distinction perde de son intérêt dans les services, où précisément la même innovation de type informatique peut affecter simultanément le produit et les conditions de production. Si l'on considère surtout l'industrie, je serais tenté de suggérer que les innovations de produit jouent un rôle plus déterminant que les innovations sur les moyens de production : le leadership industriel japonais a été acquis d'abord par une stratégie globale et à long terme fondée sur la qualité, ensuite par les innovations de produit, beaucoup moins par le recours aux robots ou aux machines à commande numérique.

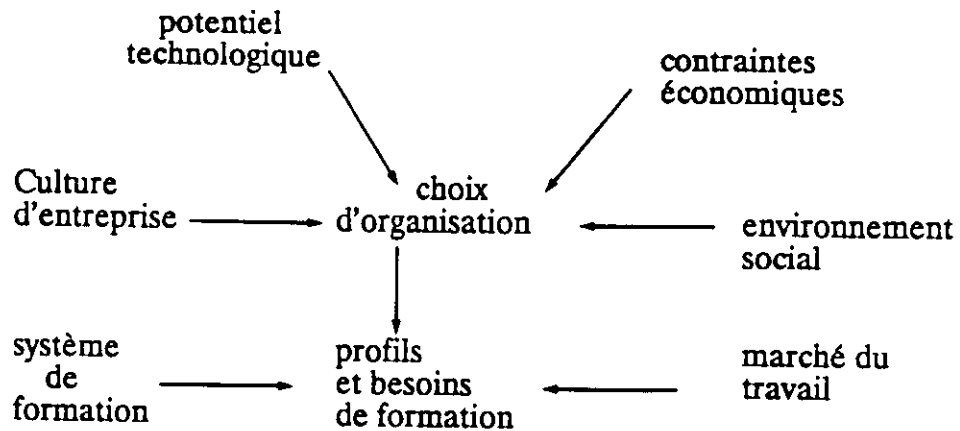
Les conséquences sur la qualification et la formation sont très différentes. Elles sont plutôt plus simples lorsqu'il s'agit d'innovations de produit, qui exigent surtout des qualifications en recherche et développement, dont on peut se demander si elles doivent être plus spécialisées ou plus polyvalentes, ou bien une combinaison des deux.

## Peut-on parler d'un impact des technologies

Si nous limitons notre champ d'investigations aux moyens de production, peut-on parler d'un impact des technologies de l'information sur les qualifications et la formation ? C'est une idée encore très répandue, bien qu'elle soit depuis longtemps battue en brèche par de nombreuses études de type sociologique. Celles-ci conduisent à remplacer le schéma simple :

technologie → qualification → formation

Par un schéma beaucoup plus complexe que l'on peut présenter comme suit :



En d'autres termes, toutes les études conduisent à dénoncer le déterminisme technologique. Tout en adhérant à ce point de vue, je voudrais toutefois le nuancer en soulignant :

. qui si le déterminisme reste prégnant dans la mentalité des ingénieurs, cela limite d'autant un éventail de choix qui serait autrement plus large ;

. que s'il existe généralement des solutions alternatives à des problèmes concrets au niveau micro, en revanche, au niveau macro le changement technologique peut induire des tendances lourdes dont on peut tirer des conclusions ayant une certaine généralité. Mais ces tendances lourdes résultent généralement d'une combinaison indissociable entre facteurs technologiques, économiques et organisationnels.

## Industrie et services

Une autre distinction mérite d'être suggérée, même si elle ne s'applique pas de manière universelle :



· dans la plupart des activités industrielles, les nouvelles technologies de l'information s'intègrent avec les technologies traditionnelles, qui restent généralement valables. Il s'agit, non pas d'un nouveau métier mais d'une dimension nouvelle apportée à l'activité traditionnelle ;

· dans la plupart des activités tertiaires, le recours à un système informatique (ex. utilisation d'un micro-ordinateur) a surtout une influence indirecte sur l'activité exercée. Il n'implique nullement une connaissance technique nouvelle -tout au plus la compréhension de circuits d'information- et l'écart reste grand entre ceux qui programment les équipements et ceux qui les utilisent (déclaration qui mériterait quelques nuances lorsqu'il s'agit de micro-informatique).

Malgré toutes ces distinctions et toutes ces réserves, il semble néanmoins possible d'esquisser quelques tendances générales, constituant autant de défis pour les systèmes de formation.

J'en ai retenu six, jugeant inutile de traiter du manque d'ingénieurs, problème que je ne suis pas particulièrement qualifié pour discuter.

## 1. Plus de place pour les non qualifiés

Jusqu'aux années 70 environ, et sous réserve des variations conjoncturelles du chômage, les "produits" les plus faibles du système éducatif pouvaient toujours trouver refuge dans les tâches simples ou moins répétitives offertes par l'agriculture, des industries comme le textile, ou quelques services municipaux. L'automatisation a surtout touché jusqu'ici ces tâches, qui sont également menacées par la pression concurrentielle et par les efforts de rationalisation qui en découlent.

Les tâches de production tendent à devenir plus complexes et plus exigeantes en termes d'adaptabilité, de capacité d'autonomie, de communication et d'organisation.

De ce fait, les exclus du système scolaire sont de plus en plus gravement exclus de la société, ce qui constitue aussi bien un drame social qu'un gaspillage économique. Le remède relève-t-il d'une pédagogie adaptée, d'une redistribution des ressources ou d'une meilleure organisation ?

## 2. Priorité aux capacités de base

On a trop tendance à compter sur la formation professionnelle pour relever le défi des nouvelles technologies. Mais son efficacité est conditionnée par la qualité des apprentissages de base sur lesquels elle doit se fonder. Il suffit d'interroger les employeurs pour constater que :

. la qualification essentielle des secrétaires est une bonne connaissance de leur langue maternelle, faute de laquelle elles ne pourraient se relire en sténo, ou feraient des fautes d'orthographe. Les connaissances techniques (dactylographie ou logiciels de traitement de texte) ne viennent qu'ensuite et peuvent s'acquérir plus rapidement. Mais la variété et la puissance des logiciels font que le travail est plus varié, plus complexe et demande plus de capacité d'adaptation ;

. avant de demander aux employés de commerce de connaître les produits et les techniques de vente, on exige de plus en plus qu'ils soient capables de communiquer ;

. de même, les employés de banque ont davantage besoin d'une bonne formation générale avant d'acquérir les connaissances techniques spécifiques et les savoir-faire nécessaires à l'utilisation des technologies de l'information. Mais celles-ci leur apportent des données plus riches qui supposent une capacité plus grande à les valoriser ;

. pour les opérateurs sur machine-outil, les insuffisances de formation portent moins sur la connaissance des nouvelles techniques que sur celle des techniques traditionnelles du travail des métaux et sur des comportements tels que la capacité d'adaptation et d'initiative. Mais le potentiel des nouvelles machines est beaucoup plus grand que celui des anciennes. Il faut donc davantage de capacité d'innovation et d'adaptation pour valoriser ce potentiel.

Ce dernier point est particulièrement important, car la plupart des systèmes de formation étaient bien adaptés à une organisation du travail taylorienne mettant l'accent sur une exécution conforme à des schémas, des normes et des instructions et ne préparaient guère à une réflexion personnelle et à un travail autonome. Or, dans un contexte perpétuellement changeant où tout ce qui est simple et répétitif tend à être automatisé, c'est de plus en plus la créativité, l'initiative, l'autonomie, la capacité d'analyser et de résoudre des problèmes et surtout de communiquer que l'on attend des travailleurs. Si la formation peut développer ces capacités, ce ne peut être qu'au prix d'une véritable révolution culturelle, plus encore qu'une modification des programmes.

### 3. Ne pas privilégier l'outil par rapport à la finalité

Les systèmes de formation sont toujours accusés d'être en retard par rapport aux besoins des entreprises et notamment à l'évolution technique. Pour tenter d'échapper à cette critique, les politiques de formation privilégient parfois excessivement la modernisation des instruments techniques. En France par exemple, on a tenu à préparer les jeunes à la micro-informatique en équipant généreusement les écoles avec des micro-ordinateurs. Mais cette décision n'a pas été précédée d'un effort suffisant pour élaborer des logiciels et former les enseignants. De plus, il ne semble pas que l'on se soit suffisamment préoccupé de définir le rôle réel que pouvait jouer l'informatique à l'école. S'agissait-il d'apprendre le maniement de l'outil ? de savoir programmer ? d'utiliser l'ordinateur pour modifier la pédagogie - ce qui n'aurait été possible qu'au prix d'un bouleversement profond des mentalités, de l'organisation et des mécanismes administratifs ? A défaut, on peut considérer que cette expérience n'a guère produit de résultats, considérant d'une part l'obsolescence rapide des techniques et des langages appris (plus

personne ne voit aujourd'hui l'utilité de l'apprentissage du Basic à l'école), d'autre part que la familiarisation avec l'informatique paraît aller de soi pour les jeunes d'aujourd'hui.

De même, dans l'enseignement professionnel français, la multiplication des applications informatiques dans le travail de bureau a conduit à créer le concept de bureautique et des formations portant ce titre, qui donnent la priorité à l'utilisation de différents matériels et logiciels, plutôt que sur l'acquisition des mécanismes de base et sur la compréhension globale des fonctions que devront assumer les diplômés. Ce déséquilibre tend à s'accroître lorsque l'on passe à la mise en oeuvre des programmes sur le terrain, car l'acquisition des techniques est à la fois la partie la plus attrayante et la plus facile à enseigner. Mais elle n'est pas la plus importante sur le long terme.

#### 4. Décloisonner les disciplines techniques

Les équipements industriels associent aujourd'hui presque toujours des éléments de mécanique, d'électricité, d'automatismes, d'électronique et souvent d'informatique. Les ouvriers et techniciens chargés de suivre leur fonctionnement et de leur maintenance ont besoin d'une vision globale des interrelations entre ces éléments et donc d'une certaine compréhension de ces disciplines ou technologies. C'est l'idée qui inspire le concept japonais de mécatronique et conduit à penser qu'il n'est plus possible de cloisonner ces enseignements.

On pourrait trouver d'autres exemples, non seulement dans l'industrie, mais aussi dans les services. C'est ainsi que l'intensification de la concurrence conduit les banques et assurances à vendre des produits similaires, de sorte que l'on peut se demander si les formations dans ces spécialités pourront rester séparées.

A l'intérieur du même domaine professionnel, notamment dans des services comme la banque, on constate que l'intensification de la concurrence entraîne une multiplication des produits, en même temps que les nouvelles formes de division du travail conduisent à la polyvalence par produit (la spécialisation se faisant plutôt par segment de clientèle). Alors qu'un guichetier de banque n'avait autrefois que quatre ou cinq produits à proposer à sa clientèle, il peut en avoir aujourd'hui plus d'une cinquantaine. Doit-il les mémoriser, ou plutôt faut-il lui faire comprendre qu'il s'agit de combinaisons différentes d'éléments de base communs ? Pour les programmes et méthodes de formation, ces exemples plaident pour une pédagogie faisant largement appel à la notion de système et ayant un caractère interdisciplinaire. Peut-on le faire passer dans les organisations et dans la mentalité des enseignants ?

## 5. Développer des compétences multifonctionnelles

Les modes d'organisation du travail traditionnels fondés sur le taylorisme impliquent généralement, non seulement une parcellisation des tâches d'exécution, mais plus encore un cloisonnement dans la prise en charge des grandes fonctions de l'entreprise : production, maintenance, commercialisation, gestion, etc... Dans l'industrie, production, maintenance et contrôle qualité relevaient de services distincts et étaient assurés par des personnels différents. Dans la banque ou l'assurance, production administrative et commercialisation étaient organisationnellement et physiquement séparés. Quant à la gestion financière et au contrôle des coûts, ils étaient la seule responsabilité de l'encadrement et les exécutants n'avaient pas à en connaître.

La technologie (en prenant en charge une grande partie des tâches de production) et plus encore les nouvelles exigences de concurrence et de gestion entraînent peu à peu une remise en cause fondamentale de cette organisation. Le surveillant-opérateur sur installation automatisée est responsable, non seulement de sa production, mais aussi du contrôle de sa qualité, de la prévention des incidents et parfois de la réparation et enfin de la recherche des coûts les plus faibles. Dans la banque ou l'assurance, la ré-intégration des tâches conduit souvent à demander au personnel d'être à la fois producteur et vendeur de services. Dans tous les secteurs et toutes les professions, beaucoup d'entreprises souhaitent que tout leur personnel intègre les préoccupations de coût et de rentabilité (de l'unité considérée comme un centre de profit ou de l'entreprise toute entière).

A cet élargissement des préoccupations doit nécessairement correspondre un élargissement de la formation. Il ne s'agit plus seulement de former aux techniques permettant de produire des biens et des services. Il s'agit aussi de mieux comprendre le contexte dans lequel s'inscrit cette production. Cela peut notamment impliquer une formation beaucoup plus généralisée aux données économiques de base et notamment aux principes de la gestion des entreprises.

## 6. Mettre en oeuvre de nouveaux modes de relation entre l'école et l'entreprise

La mode est aujourd'hui à la critique de l'école et au rôle prédominant de l'entreprise. Toute une série d'arguments peuvent être opposés en faveur de l'un ou de l'autre :

- il est vrai que l'accélération du produit technique, la complexité et le coût croissant des équipements font qu'il est de plus en plus difficile, sinon impossible à l'école de se tenir à jour de toutes les évolutions et d'offrir à ses étudiants toutes les facilités pour une formation pratique dans les conditions réelles de production. Il est évident par exemple que les écoles professionnelles ne peuvent plus s'équiper des derniers modèles de machine-outil à commande numérique, ce qui plaide notamment en faveur des équipements pédagogiques de simulation ;

- parallèlement, le vieillissement démographique et le ralentissement du renouvellement de la main-d'oeuvre impliquent nécessairement que son évolution se fasse davantage par la formation continue, ce qui tendrait à diminuer corrélativement le rôle de la formation initiale et donc de l'école ;

- d'un autre côté, tout l'exposé qui précède conduit à souligner le rôle fondamental des mécanismes fondamentaux, des attitudes et des éléments de la formation les moins spécifiques et les plus transférables (analyse que rejoignent d'ailleurs les responsables des plus grandes firmes). Est-ce bien le rôle de l'entreprise de former à ces éléments ?

On ne voit guère d'autre réponse à ce dilemme que le renforcement des liens entre l'école et l'entreprise, notamment sous forme d'alternance. Mais une véritable alternance ne se limite pas à la juxtaposition de périodes de formation dans les deux contextes. Elle suppose une articulation réelle entre ces périodes et notamment un lien étroit entre théorie et pratique, qui constitue le défi permanent de la pédagogie.

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Il pourra paraître surprenant que dans une réunion consacrée aux conséquences de la technologie, celle-ci n'apparaisse pas au premier plan. Notre propos n'est pas de nier son rôle, qui est bien entendu considérable, mais de souligner que ses effets sont complexes, souvent indirects plus que directs et surtout indissociables des conditions socio-économiques. S'il fallait résumer en une phrase les défis que l'innovation technologique pose à la formation, nous dirions que le défi majeur n'est pas de former les hommes à l'utilisation des machines, mais de les former à faire ce que les machines ne peuvent pas faire, c'est-à-dire innover, s'adapter à des situations imprévues, établir des relations entre des données non prédéterminées et surtout communiquer et développer une relation humaine. A notre avis c'est beaucoup plus difficile, mais la technologie peut y contribuer en diminuant la part de travail fastidieux et en apportant les informations et les instruments permettant à l'homme de mieux utiliser ses capacités.

## Towards a changed trainers' profile

### Premise :

It is wrong to deduce guidelines for teaching and training from technology. We must be ahead of the technological status-quo, otherwise we resign as humans.

### Task :

We in educational education and training are challenged to handle that problem.

### Strategy :

We all know that the effects resulting from key qualifications search far beyond the original intentions connected with the key qualifications. Thus, if we endow learners with key qualifications we shall create an invaluable potential for future tasks.

We should encourage learners to experiment in order to see free human abilities which far so long had been victims of dequalifying educational processes. This is particularly true of the older generations whose education and training so much focussed on specialisation.

If learners are allowed to experiment we are on the right way from here and now towards the future.

T.T. exercices :

(A three-step example)

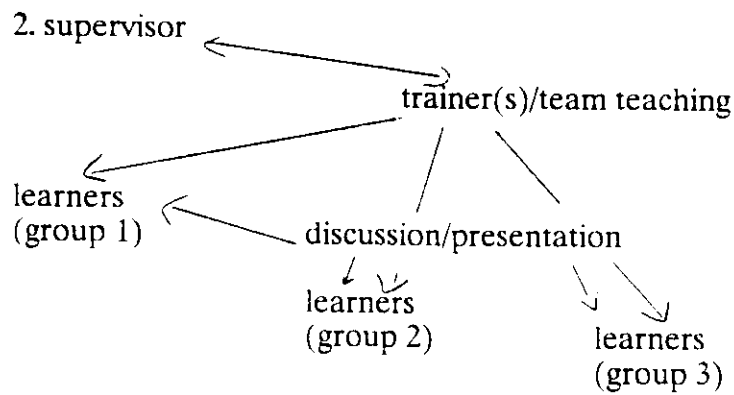
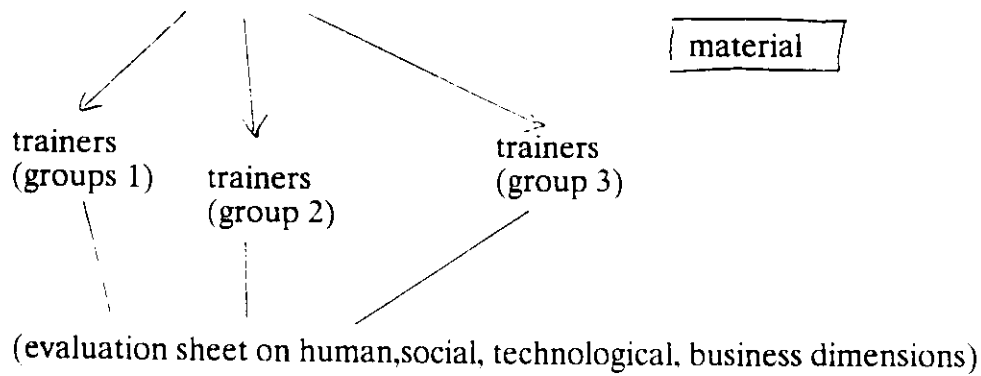
1. "Develop a PLC for a pedestrian traffic light?"

- a. Division of tasks :
- technological scheme
  - flow chart
  - programme
  - cost/effect aspects
  - protocol
  - presentation of results

b. development/experiment

c. demonstration and discussion of results

("Trainers/teacher must learn to be learners !)  
Supervisor (observation sheet)



3. cfr. step 2 . without supervisors

## **Innovation in training and how to promote it**

1. Technological advances in the field of electronics computing, information technology and telecommunications have primarily been generated through research and development funding in the areas of defence and to a lesser extent in industrial and commercial processes.

2. In each of these areas there is incentive, either from the view point of national security, or the potential profits to be made, for both public and private investment.

3. For every step made by technological development through such R & D funding there is a potential educational and training applications spin-off. Such educational and training applications require further development funding although the amount is minimal compared to that originally invested. For example :

- the development of the micro-chip and the desk-top micro-computer while primarily for business use provided the platform for the development and delivery of computer based training.

- the development of the electronics required for the video recorder when coupled with the micro-computer, provided the incentive for the development of interactive video for the educational and training world.

- the development of telecommunications, both terrestrial and satellite for the transmission of computer data around the globe at high speed has enabled the extension of its use in linking remote teachers and learners.

- the development of risc chips, dvi chips transputers and parallel processing is now being investigated as a means of producing complex simulations in real time for which a multitude of potential training applications exist.

- the massive investment in the development of the audio compact disc which has revolutionised the music industry has generated further investment in linking this to computer technology to produce CD-ROM and CD-I, albeit for business and home entertainment. A small investment in their use in education and training will produce the basis of further growth in importance of the innovative development and delivery of training.

The selection and funding of projects to exploit the educational and training potential of these major technological developments has been the work of the Learning Technology Unit for the past eight years, during which time the UK has made a major contribution to innovative approaches to training and learning.



Oxford Nov 1990

Le succès d'un projet innovatif de formation dépend, à mon avis, ni du contenu ni des méthodologies! Cette définition peut tenir du paradoxe mais mon expérience dit que sur le terrain des contenus et des méthodologies nous avons beaucoup de convergence d'idées et de stratégies.

Dans mon travail - ce que j'ai vérifié - le problème central consiste dans la gestion des projets, parce que la gestion implique plus d'acteurs institutionnels et exige plus de synergies.

Il est nécessaire donc, que celui qui s'engage à la réalisation d'un projet innovatif soit conscient qu'il travaillera dans un 'context' où chaque action sera suivie de plusieurs 'réactions' qui pourront être aussi pas convergents avec l'objectif qu'il a assigné au projet.

Telles réactions viennent des différents 'acteurs' qui seront engagés (différents niveaux institutionnels, différentes entreprises, etc.).

Par exemple : si je réalise une activité de formation des formateurs dans le domaine de la formation professionnelle, pour obtenir le succès de mon projet je dois tenir compte de plusieurs éléments :

#### 1. La dimension humaine

Le formateur n'est pas une 'nomade', mais il est au centre d'une série de relations humaines, professionnelles et insitutionnelles.

#### 2. La dimension sociale

La période dédiée à la formation doit devenir un 'investissement' pour le formateur. Il doit 'gagner' quelque chose en terme de 'status'/argent/carrière etc.

#### 3. La dimension technologique

L'innovation technologique devient, une fois qu'on va l'introduire dans les systèmes de formation, occasion de changement dans l'organisation. Si ces changements ne sont pas prévus ou guidés ou 'gérés' le projet est destiné à la failure.

#### 4. La dimension économique

C'est, à la fois, soit une combinaison des différents aspects soit un aspect ultérieur à considérer.

Anna GAMMALDI  
FORMEZ  
Roma (Italia)

## Policy implementation

Innovation in the training policies requests at least :

- the "human-capital-view" on the (top) management level of enterprises ; the necessity of investement in training is an important requirement for successful acting on the market.
- a closes link between education and training ; education and training as parts of a life-long learning process.
- a coopeeration between state and industry in education and training ; one of the advantages of the "dual system" in GER is the dissemination of innovation into training-courses of state and industry.
- the development of key-qualifications through education, e.g. self-learning-competency, social competencies ; but we should not forget : education is much more than qualification !
- through exchange of information in a wide area of innovative approaches in different countries.

Peter GROTZ  
Task-Force Human Resources  
European Commission

27/11/90

Mi contribucion se refiere al punto 5 (los metodos de formacion).

Uno de los temas que hasta el momento no se le ha dado la importancia que deberia, y sobre todo a nivel oficial, es el de la "autoformacion", ya que gran numero de tecnicos que trabajan en el campo de las nuevas tecnologias perfeccionan su formacion con su propio esfuerzo ; una veces porque los planes de formacion no contemplan el aspecto que los interesa, y otras porque sencillamente carecen del tiempo necesario para entrar en uno de estos planes.

Pienso que en este terreno hay dos posibles huecos a cubrir :

1.El establecimiento de una estructura informativa que ayude a encontrar documentacion, pedir consulta, etc.

2. Conseguir que de alguna manera se contemple de manera oficial este tipo de formacion, de forma que el gran esfuerzo personal que supone, quede reflejado en el propio curriculum profesional

Juio DIAZ - OTERO

Oxford, Nov. 27/29,1990

## EUROTECNET

### Atelier sur l'innovation dans la formation

Proposition de G. FRAGNIERE

Référence: **Etapes 7 et 8**

Une des transformations radicales que la formation va connaître dans les années qui viennent, en fonction précisément de l'accomplissement du marché intérieur et de la nécessité de la reconnaissance mutuelle des diplômes, est une révision fondamentale des procédures de certification des qualifications professionnelles.

Deux facteurs principaux entraînent cette révision nécessaire:

- la nécessité d'une reconnaissance transnationale des qualifications met fin aux structures nationales mises en place dans ce but;
- les qualifications certifiées par les systèmes formels de formation ne correspondent plus aux changements des occupations qui ont eu lieu dans le monde du travail en raison de la révolution technologique;

L'accord passé entre les système formel de formation et les associations professionnelles qui, dans la plupart des pays, donnait un *monopole* de la certification aux organisation formellement organisées, va donc être remis en cause. De nouveaux acteurs vont entrer en jeu, à savoir les utilisateurs des qualifications, c'est à dire les **entreprises**. Deux types d'entreprises vont particulièrement influencer cette évolution: les grandes multinationales, qui vont mettre en place des systèmes de carrière liés aux qualifications réelles ( pas seulement les diplômes), et les entreprises technologiquement d'avant garde, qui devront en permanence définir des occupations et des qualifications nouvelles.

L'innovation requise, dans cette hypothèse, est la mise en place d'un système de certification nouveau, dont les caractéristiques principales seront les suivantes:

- fin du monopole de certification des systèmes formels de formation;
- relativisation des diplômes de départ dans la structure hiérarchique du travail et de l'emploi;
- distanciellement des associations professionnelles par rapport aux systèmes de formation;
- fonction accrue des entreprises (utilisateurs) dans la définition des contenus de qualification et dans la certification elle-même.

Illustration: qui certifiera les compétences de l'ingénieur des télécommunications de l'avenir?

Some statements on innovation in training and how to promote it.

Peter Plougmann, Danish Technological Institute.

EUROTECNET Workshop on Promoting Innovation in Training.  
27.-29. November 1990 Blenheim Palace, Woodstock, Oxford.

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### The status of Training

Talking about innovation in training we must realize that training is not an aim in it self, but a tool for changes in the production proces in order to enhance efficiency and create a better working life.

### The role of Industrial Relations

We also have to bear in mind that the four aspects of innovation; Human, Social, Technology and Business, are dependent of each others, but they are not equally important, according to the view of the social actors. There are also a large number of potential conflicts of interest between these actors, which we have to take into account, when we are going to give priority to the ten fields of action in which innovation is needed. Management and labour have traditionally different opinions on such priorities. According to among others historical reasons the development in Industrial Relations differ widely between memberstates and experience with different kind of innovations in training has to be interpreted according to the state of art of the Industrial Relations. E.g there is a self-understanding in Danish working-life of being relatively 'progressive' compared to other countries. As a part of the 'Scandinavian Model' industrial relations are characterized by a relatively high degree of cooperation, there are collective agreements on workers' participation. This has a profound impact on the way to think in terms of training at both company level and different segments of the labour market. Although it generally is a management responsibility to point out the business goals, the way to make them come through is increasingly becoming a joint task involving new concepts of organizing the production process and new ways of thinking about worker participation. One may talk of a need for new management skills applied to the need for reorganizing the division of labour in a given company.

Based on this kind of arguments I think it is important to agree upon a common concept of the firm of tomorrow. In the following I am going to address three parties of this concept being aware of the fact, that there currently is a lack of empirical evidence concerning some of the tendencies.

### Three statements concerning a concept of the firm of tomorrow

#### A) The new concept of the industrial firm : more service

Due to among others the changes in the scientific, technological and industrial basis it does not make much sense to look at the industrial firm in a traditional way with the focus of interest on the prime production process activities and the blue-collar workers. Beside a tendency towards specialization, more focus on efficiency and not on labour productivity, the most dominant force in the organization of production today, is the increasing importance of service functions embodied in manufacturing activities. We are talking about both design, maintenance, repair, financing and continuous need for training of manpower. The reason for this development can be seen as the growing complexity of production and society, the need for better management and more target marketing, and of course the need to adjust to the changing condition on the global market. Key-words are: strategical planing, flexibility, efficiency and liberalization of the market.

#### B) New tendencies in company strategy : 'The flexible firm'

As far as I see there is no doubt a tendency away from tayloristic production towards more skilled-based production. This tendency is partly due to the increasing recognition of the need for consensus between management and labour on the questions of implementing new technologies. Training as part of a well designed personnel policy has to be seen as an integrated part of the overall company strategical priorities. This has turned out to be for the benefit of the core-workers of the companies.

But at the same time there is an increasing tendency to use subcontractors as a way to rationalize production and reduce financial risks. Consequently this affects the use and composition of manpower, thereby reflecting the concept of the 'flexible firm', and increasing the number of workers outside the core of the companies manpower. The need for skills and formal qualifications among these peripheral workers is rather limited compared to that of the core-workers. The overall effect of this strategy is a further balkanisation of the labour market.

#### C) Networking as development strategy

In a period of great turbulence in politics and economics the uncertainties of the future make it necessary to the individual firms to reorganize, accept increasing transactions costs and form alliances with companies normally regarded as competitors, with authorities and unions as well in order to implement a given strategical development plan.

For a country/region (like e.g. Denmark) characterized by the

dominance of SMEs such a total concept necessarily must lead to network strategies, because the individual SME cannot possibly cope with all functions. - Or is the solution that SMEs have to become specialized subcontractors of large multiregional/national firms being able to cover all the service functions needed?

Altogether, this calls for a better understanding of the way firms organize the necessary production functions. How do firms e.g. organize the innovation of services and integrate these innovations into the total production process. What are the consequences of investments in immaterial capital, e.g. human capital, what changes may be expected in the industrial relations at both firm level and on the labour market as a whole?

I think it might be useful to discuss the implications of both the changes in Industrial Relations, the need for more service, the "Flexible firm" concept and the networking strategy on the need for innovation in training, if we are going to address the right kind of problems and make proper priorities between the ten proposed fields of action.

Tendencies and questions like the ones mentioned are essential to face, if we want to have knowledge of the impact of today's rapid changes in Europe on working-life in general and needs for innovations in training in particular.

There follow ten "small steps" considering this question, drawn in part from the results of MARI's study of mid-level human resource development in support of the STRIDE programme for DG XII.

1. CEDEFOP have concluded that the failure to forecast vocational skills requirements is one of the main weaknesses of regional development strategies. Given that skills requirements change fastest where the technological impact is highest, this must impact most heavily on training in the new technologies.
2. Can one predict innovation, future technological developments and their effects? There must be grave doubts as to the feasibility of providing "one-shot" training of engineers and technicians today for tomorrow's technologies.
3. Prediction of skills requirements can be circumvented by training for multi-skilled and adaptable technicians, with polyvalent hybrid skills and the capacity for self-learning (itself a theme within Eurotecnet)? This model requires the constant updating of skills by trainers themselves. In the IT field managerial staff need to provide an environment where they can learn from their youngest, most up to date staff.
4. The relationship between technological change, training, and practical applications in a work setting means that the edges between work and training must be blurred.
5. There should be mechanisms enabling the transfer from work to training and vice versa.
6. Promoting innovation implies the encouragement of innovative people and raising levels of innovation. This may even involve creating an atmosphere more conducive to random or accidental technology transfer - consider Root-Bernstein's mechanisms for discovery (see attached).
7. CEC policy (for example the new rules for the structural funds) actively discourage innovation. It is now far more difficult to run an innovative project, and this is carried over to initiatives like EUROFORM with the requirement for 50% public funding. Should there be a special intervention rate for innovation, as there is for Objective 1 regions?
8. There should be closer links between R&D and training - consider MARI's own story.
9. There should be consideration of a regional dimension, particularly in relation to the CEC's responsibilities for cohesion and modulation
10. Consideration should be given to the thinking of other DGs, eg on Human Capital, to see if mechanisms can be transferred.



## MECHANISMS FOR DISCOVERY

From Discovering: Inventing and solving problems at the frontiers of scientific knowledge, by Robert Scott Root-Bernstein

avoidance of routine curricula

decentralisation of funding for science

young scientists should travel

old ideas should be re-examined

researchers should investigate a number of problems simultaneously

researchers should change to completely new fields every few years.

Training PartnershipsSteps 4 and 8

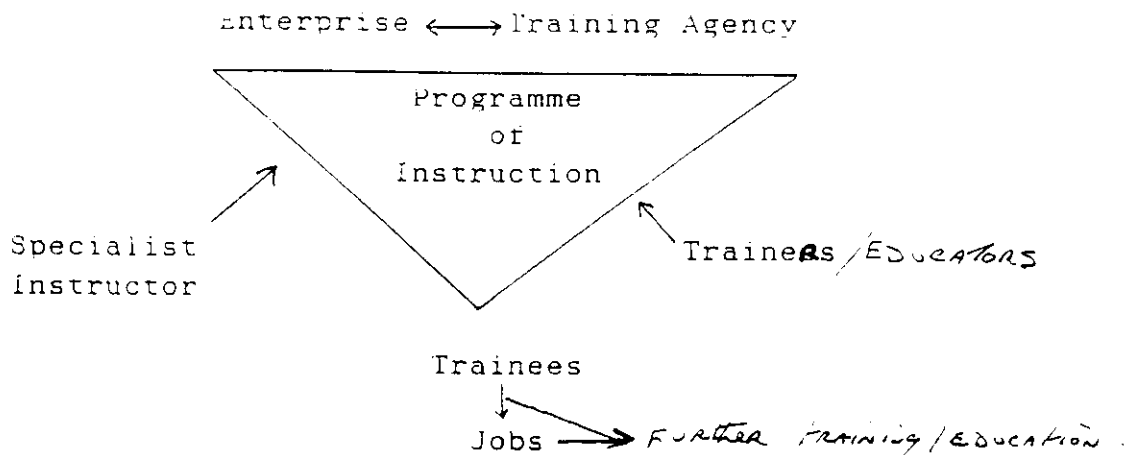
A training partnership should exist between the enterprise and the training agency whereby the programme content and the training process are agreed jointly. The enterprise provides specialist instructors (employees) and partly finances the training process.

Trainers

It will not be possible to train and retrain all trainers given the breadth and pace of technological change. Better to train trainers in developing the "characteristics" required of the new trainee. Schumann spoke of "the special ability of human labour to associate, link together events, improvise, make discreet judgements and co-operate with others". Other "characteristics" like initiative, enterprise, self-confidence and language skills. These skills can be encouraged, developed and taught and will increasingly be relevant.

"Specialist Instructors"

The Enterprise provides the specialist instructors who have the new knowledge and experience. They provide the "special-skills" training element. In many cases these instructors will be bringing new and innovative skills to the programme and new procedures to the training process. In some cases these specialist skills are only available within the enterprise. Training methods (step 5) will be influenced by new industrial practice and this in turn will influence methodologies in the other areas of the training programme.



This partnership between the enterprises and the training agency will ensure regular innovation and on-going relevance in the training pursuit.

## TRAINING INNOVATION

TOM LYONS

The critical innovation relates to TIMING - training that impacts on and leads CHANGE in a significant way and intends to enhance the quality of change itself.

- What makes for effective change  
(SLIDE)
- What factors improve the quality of change  
(SLIDE)

The second innovation relates to emphasis, the emphasis placed on:

Learners learning, rather than Trainers training

Learning is more about acquiring knowledge of how to introduce change and;

Training is more about acquiring knowledge of what change to introduce

(video/presentation)

## Some Thoughts on Innovation in Training

Michael Pearn, Pearn Kandola Downs

### PROMOTING INNOVATION IN TRAINING

#### EUROTECNET WORKSHOP

Oxford, 27 - 29 November 1990

#### STEP 10? The Alternative Dream

There is one "step" missing from the TEN INNOVATIVE STEPS. This is THE LEARNER! A key issue for the next ten years is how to involve learners themselves in identifying learning needs, not only as individuals but also as groups, and just as importantly being involved in the design and conception of ways to deliver or achieve learning. It is well recognised in many spheres of activity that involving the eventual consumer or customer in the design stage results in better product or service design. How to find ways of involving the learner more systematically in designing and creating opportunities for learning, especially in the workplace, is a significant challenge. How can technology help?

#### STEP 8 The Enterprises

The notion of the "learning environment" is more talked about than achieved in practice. It is more common in vocational training or educational establishments, and occasionally within training centres in companies. There is a very significant need for enterprises to become complete "learning companies" or "learning organisations" capable of continuous self-learning and self-transformation. This has implications for

- the training and development of managers
- the expectations of employees (from school-age onwards)
- the development of practical tools and methodologies for creating and sustaining the reality of a "learning company"
- the establishment of models for others to learn from the role of "trainers"

#### STEP 4 The Trainers

Everyone is a trainer just as everyone is a learner. Perhaps the most useful role for people called trainers is to develop and support operators, technicians, specialists, and managers in their role of facilitating learning in others. Perhaps we should abandon the job title "trainer", and replace it with words such as coach, counsellor, facilitator consultant. The notion of "manager as coach" is crucial to the adaptive self-transformation of enterprises. We need to define when and under what circumstances are we all in the role of "trainer". The question is not "who is a trainer?" but "when is one a trainer?".

STEP 1. THE WORK PLACE

Stereotypes of what is meant as "workplace" should be overcome. An increasing differentiation among types of workplace can be forecasted ("tele-work" is the border example). Thus, the qualifications required have to be identified among a wide range of situations related to the sectoral patterns and to the kind of innovation processes in which any specific workplace is involved.

STEP 2. THE POLICY IMPLEMENTATION

At the firm level, the decision-makers will increasingly consider training as a really "strategic" issue but training activities have to be linked to the general policy of the enterprise and to other ones such as "organizational development" and "quality". (See also steps 7 and 8).

STEP 3. THE TECHNOLOGICAL CHANGE

In some cases (e.g. training for SME's) the technological change must be "anticipated" by training activities. This is easier when training organizations function like other kinds of "organizations for innovation" (e.g. R&D departments) with specific roles of "gatekeeper", serving as information resource for other interrelated roles (see below).

STEP 4. THE TRAINERS

The profile of the trainer-teacher should be articulated/integrated with different new roles within the "training organization for innovation": "gatekeeper", "idea generator" (especially devoted the design of the training activities), "project leader" (for their management), "entrepreneur" (for the links with the external environment), etc..

STEP 5. THE TRAINING METHODS

The effective training interventions are those "tailor made" for specific needs of organizations and people. The problem is how to integrate in these customized interventions the training methods and technologies which are designed in a "pret-a-porter" dimension (assumed that they allow scale-economies and embody really useful knowledge).

STEP 6. THE MARGINAL GROUPS

In many cases training is not the solution for these groups if not integrated in "social" interventions.

STEP 7. THE EUROPEAN COMMUNITY,S RESPONSIBILITY

The policies of the Member States will be increasingly influenced by the decisions at the Community level. The quality of these decisions will have positive impacts if they create closer links between the training policies and the other ones, such as R&D, local development, SME,s support, etc.

STEP 8. THE ENTERPRISES

In general, innovation in training depends on the cultural level of the management. But, of course, the innovations in this field are strongly related to the technological and organizational development of specific firms (see steps 1 and 2).

STEP 9. THE ACCESS TO TRAINING

Democratisation is the goal, but loss of quality and wastage of resources are dangers to be avoided.

STEP 10. THE ALTERNATIVE DREAM

Reduction of training. Expansion of learning.

Objective : training "high risk" people → low educated  
→ 1 year unemployed

paradox they need long term training  
they have short view  
they want fast solutions

Two solutions :      1. limited objectives : but are there jobs ??  
                                 2. step by step progress

We have a self learning system with assistance of a tutor but low educated

don't fit  
feel uncomfortable  
unsecure  
can't learn

May be they want a traditional school system with a teacher in front → back to the future

K. Demeyere

**ANNEX THREE**  
**LIST OF PARTICIPANTS**

# EUROTECNET

Workshop

## PROMOTING INNOVATION IN TRAINING

Oxford, 27-28-29 November 1990

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## PARTICIPANTS EVALUATION OF EUROTECNET WORKSHOP

### "PROMOTING INNOVATION IN TRAINING"

Oxford, November 27 - 29 1991

#### Introductory Note:

Evaluation sheets were completed by 12 of the 19 participants who attended the last session of the workshop (EUROTECNET team members and animators themselves did not complete the evaluation sheets).

#### Global summary of responses

##### Organisation

good	satisfactory	not satisfactory	poor	not filled in
92%	8%			
(11)	(1)			

##### Hospitality

good	satisfactory	not satisfactory	poor	not filled in
92%	8%			
(11)	(1)			

##### Presentation of papers

good	satisfactory	not satisfactory	poor	not filled in
42%	50%			8%
(5)	(6)			(1)

##### Workshops

good	satisfactory	not satisfactory	poor	not filled in
17%	58%	25%		
(2)	(7)	(3)		

##### Should this type of exercise be repeated ?

Yes	Yes but...	no answer
75%	17%	8%
(9)	(2)	(1)

## Responses to each question

### 1. Organisation

More than 90% of the participants considered the organisation to be good. 8% felt it was satisfactory.

Some comments :

- Invitation sent very late
- The conference centre's facilities for small groups were not very good

### 2. Hospitality

Almost 92% said that the hospitality was good. 8% considered it as satisfactory.

Some comments

- very good standard from both EUROTECNET and Pearn, Kondola, Downs who looked after the local organisation
- a visit of Oxford could have been included in the programme
- lack of free time.

### 3. Presentation of papers

For 42% the papers were good while 50% think they were satisfactory. 8% did not answer this question.

Some comments

- in the group, there was not enough time to consider the contributions everyone had prepared
- try to employ different media

### 4. Workshops

17% said they were good

58% felt they were satisfactory

25 % felt they were not satisfactory

Some comments

- topics were very interesting
- the rooms where the workshops took place were not appropriate
- the approach was too broad and the theme was difficult
- better formulation of the theme: the innovation is the result of a processus. There is no innovation at the conception level !
- the "animateurs" could have better stimulated the working group
- the papers prepared by everyone should have been better integrated in the workshops
- the "animateurs" were too "individualist", their role was to generate a group discussion but they did not succeed in this

5. Which aspect of the programme was most useful to you ?

Three people did not answer this question.

Some individual comments of participants are as follows :

- information on future of EUROTECNET and its new focus on innovation
- exchange of experience with other members
- the modality of working together
- meet other actors in a global, regional approaches & collective definition of a perspective for new research-studies
- plenary sessions & informal discussions
- people's statements of their ideas (particularly the idea of having prepared sheets was useful)

6. Which aspect was least useful ?

Four people did not answer this question

Some individual comments of participants are as follows :

- not enough specific discussion on projects examples
- themes were not concrete
- lack of time for discussion & exchange
- brainstorming operated on the basis of having different concepts but it was assumed that the results of the session were a common understanding

7. Should this type of exercise be repeated ?

1 person did not answer this question.

All the others felt that this exercise should be repeated.

Some comments expressed were :

- yes, but choose a smaller topic
- yes, but the seminar should be more structured

8. What problem did you encounter ?

Some individual comments were :

- lack of time & more "front-end" exchanges-information required to improve quality and quantity of outcomes achieved
- language problems
- contradiction between : priority on SMEs and rather pessimistic speech concerning SMEs : "all has already been tried and nearly all has failed".  
Nevertheless, the question of SMEs remains central : why ?  
We need a statement (balance) of the weak and the strong points.

- the division of groups by language may have restricted the cross fertilisation of ideas in groups
- matching with other professional mentalities but this was also interesting and challenging

9. Recommendations

- more familiarisation of the outset
- invite SMEs' managers
- provide more quiet time between sessions for reflexions and thinking
- before the seminar, circulate the list of participants with a short description about their organisation
- ensure that all Member States are represented
- divide the groups by special interest on particular disciplines rather than by language