EUROPEAN COMMISSION

**STRATA-ETAN EXPERT GROUP ON FORESIGHT FOR THE
DEVELOPMENT OF HIGHER EDUCATION/RESEARCH RELATIONS**

HIGHER EDUCATION AND RESEARCH FOR THE ERA : CURRENT TRENDS AND CHALLENGES FOR THE NEAR FUTURE

FINAL REPORT OF THE STRATA-ETAN EXPERT GROUP

DEVELOPING FORESIGHT FOR THE DEVELOPMENT OF HIGHER EDUCATION/RESEARCH RELATIONS IN THE PERSPECTIVE OF THE EUROPEAN RESEARCH AREA (ERA)

by Prof. Etienne Bourgeois,

Rapporteur

EUROPEAN COMMISSION

RESEARCH

Commissioner : Philippe Busquin

Directorate-General for Research

Director General: Achilleas Mitsos

The Directorate-General for Research initiates, develops and follows the Commission's political initiatives for the realisation of the European Research Area. It conceives and implements the necessary Community actions, in particular the Framework Programmes in terms of research and technological development. It also contributes to the implementation of the "Lisbon Strategy" regarding employment, competitiveness at international level, the economic reform and the social cohesion within the European Union.

The Directorate " Knowledge-based economy and society" (Directorate K) contributes to the realisation of the European Research Area in the fields of the social sciences, economic, science and technology foresight, and the respective analyses. To this end, it monitors and encourages science and technology foresight activities, conducts the economic analyses necessary for the work of the Directorate-General, and co-ordinates policy as regards the relevant political, economic, human and social sciences. It prepares the European reports on science and technology indicators, and it contributes to the development and implementation of the Framework Programmes in these fields. It monitors the progress made in the implementation of the Lisbon strategy.

Unit K 2 - "Science and Technology Foresight, links with the IPTS"
The unit contributes to the Directorate General 's policy reflections by conducting forward-looking analyses and syntheses and encourages, together with other Directorates, DGs and IPTS/JRC, co-operation between the actors and users of foresight in Europe. It is also responsible for the implementation of the related actions (5th and 6th Framework Programmes).

Director: Jean-François Marchipont.
Head of Unit K2: Paraskevas Caracostas
Scientific Officer: Elie Faroult
E-mail: elie.faroult@cec.eu.int
www.cordis.lu/rtd2002/foresight/home.html

FOREWORD

The 20th century claimed to be the century of a huge explosion of science and technological discoveries and applications. Progresses in these domains were indeed spectacular. It is also true that this exponential development was accompanied by increasing complexity of the research fields and disciplines, a growing divergence of understanding of scientific issues by citizens, increasing possibilities of wealth and emergence and growing influence of experts in policy decision. Citizens, even those with a higher education, often felt themselves increasingly remote from the decisions.

Europe, because of its social tradition stressing particularly education and training, resisted probably better the sirens of artificial modernity than other continents. As from the appearance of the first universities; at the end of the Middle Ages in Prague, Bologna, Paris or Salamanca; students were introduced to an overall vision of the sciences, and to the integration of the historical and philosophical dimension of their disciplines. Moreover, the apprenticeship of the scientific discipline revolved narrowly with research, constitutive dimension of the progress of knowledge, motor of change, progress and growing knowledge transfers.

The 21st century starts with the feeling, shared by a growing number of citizens, for a need for "more operational" training, nearer the labour market, but at the same time more responsible and more citizen oriented. European Universities must respond to the challenge.

How to articulate that high level training, both practically and concretely, contributing to knowledge production and bringing students to a better comprehension of the world in which they live? The contribution of research already carried out in the 5th FP, to be continued in the 6th, made it possible to place some milestones in this strategic domain for the future of the European Knowledge Society.

It is to better understand the developments in the relation between higher education and research and the challenges to which our European Society is exposed, that we set up a High Level Expert Group on this topic. The question posed was of the possible futures for this relationship. The foresight approach has produced some scenarios of possible futures. These scenarios should be used, both at the European and national level, to define better policies and actions to be implemented in achieving the goals laid down at the Lisbon Council, "to make of Europe the most competitive knowledge economy in the world".

In this group, more than 40 experts under the presidency of Maurice Godelier, Professor in the School of the High Studies in Social Sciences (Paris) assisted by Etienne Bourgeois, Professor at UCL (Louvain-la-Neuve), as a rapporteur, produced a report, the density and the synthetic character of which have to be stressed. Broad diffusion of this report will contribute to pursue the reflections in this field, bringing, I am sure, elements to define better and orient the actions of the Commission, as well as those at the level of the Member States.

Philippe Busquin
Commissioner for Research

TABLE OF CONTENTS

ACKNOWLEDGEMENTS

EXECUTIVE SUMMARY

The Expert Group's Agenda

A STRATA-ETAN expert group was set up in December 2001 with the mission to prepare a report on options to support European co-operation in Foresight for the development of Higher Education/Research (HE/R) relations in the perspective of the European Research Area.

The **21 members** of the expert group, chaired by **Maurice Godelier** and rapporteur **Etienne Bourgeois**, come from a wide variety of countries (EU states members, Accession countries, and Canada) and of disciplinary background. Every one of them wrote, "issue papers". Each of these individual contributions deals with one (or a limited number of) aspect(s) of the HE/R relationship, in terms of trends, challenges and scenarios. More members of the group (15) participated as discussants. The expert group met four times, from December 2001 until May 2002. The last three **meetings** (26-27 March, 25-26 April, 27-28 May 2002) were devoted to discussions of the individual issue papers. Each of them has been revised at least once during this process. The rapporteur on the basis of the individual issue papers and the group discussions on those contributions prepared a final report. Preliminary drafts of the final report were submitted to the group and discussed, mainly in the April and May meetings.

On the basis of an in-depth analysis of the **current trends** that could be identified with respect to the various aspects of the HE/R system in Europe, the group has identified **major challenges** for the development of the system in the near future. Those challenges are key issues, questions, problems, that leave several options open for action and therefore call for political choices to be made at various levels (institutional, national, European). The analysis of trends and challenges led the group to sketch several possible global **scenarios** for the development of the HE/R system.

It must be underlined that the focus of the group's work is really on the future development HE/R **relationship in Europe**. Rather, it has examined the HE/R relationships, with special attention to in two aspects. One concerns the use of research in basic higher education (education of the citizen and the professional) and the other concerns the education and training of researchers.

It is also important to emphasise that the group's work was essentially **prospective**, not descriptive. In particular, the report does not provide a systematic review of the state of the art of the HE/R system and its context in Europe. Rather it examines:

- Major trends that can be observed or anticipated and that are likely to shape the HE/R landscape in the next years;
- Questions they raise for thinking about the future of the HE/R relation;
- Options they leave for action to shape the future of the HE/R relation.

The final report focuses on the **broad trends** that affect the HE/R system across Europe. **HE/R system** should be understood here in a broad sense, which is certainly not restricted to universities. It includes that various institutional agents that directly participate in the production of knowledge (basic and applied research, technological development and innovation) and in the provision of any level of higher education (undergraduate, graduate, postgraduate and continuing education, in the arts and sciences as well as in the professions).

Main issues discussed in the group

Rise of globalisation and market forces

- ***Crisis of the « Nation-State »***
  The globalisation of markets (and the growing interdependence of national economies), combined with the European construction process has gradually eroded the power of the "Nation-State" in Europe in many areas. The notion of citizenship has gradually lost its original meaning, which identifies the citizen as a member of a nation. Educational systems are gradually losing their function as central agents of national integration. This trend will have major consequences for the system, mainly in terms of transnational convergence of the HE/R system, competition among HE/R institutions for students, staffs and resources, and mobility of students, researchers and staffs.

- ***Erosion of the « Welfare-State »***
  Relative reduction of the role of the state in the market regulation along with a downward trend in public funding in many sectors, including HE and Research. Both the extent and the forms of this phenomenon vary widely across European countries, depending on their history and sociological pattern regarding the role of the State in society. The trend towards some deregulation of the HE/R can also be observed in the trend of "marketisation" of knowledge, considering research and education as "private" goods, which can be bought and sold by and for particular interests.

- ***Rise of neo-liberal ideology and practices***
  The rise of the market economy has been associated with liberal ideology and practices that have more or less deeply penetrated many sectors of society, including education and research. Business-like management practices, values, and even vocabulary are affecting in HE/R institutions. The rise of individualisation of learning paths that is observed in HE can also be interpreted in the light of this trend.

Rise of Knowledge Society

"Knowledge Society is a post-industrial society based on production and dissemination of information that increases individuals and companies' knowledge". It has several characteristics, which distinguishes it from Industrial Society.
- It has upset the relationships between labour, leisure and education. The proportion of time available for education and leisure is significantly increasing, whereas the three activities tend to coexist throughout life.
- It requires more and more high-level job qualifications, both advanced knowledge in specialised areas, but also generic and complex cognitive, social and emotional competencies.
- In such a society, knowledge is growing at exponential rate, technologies and work environment and demands are changing more and more rapidly. The nature and organisation of labour is getting more and more complex. In such a context, workers need to have learned to learn. This is the notion of "educability". They must have the capacity to adapt but also to be creative in rapidly changing work environments. This is the notion of "employability", or, even better, "sustainable employability".

This whole notion of knowledge society at this point of history is partly becoming a reality and can reasonably be expected to be more so over time but it largely remains an ideal in the current situation. Turning to the HE/R system, it must also be pointed out that the idea of thinking of curriculum and instruction in terms of competence, with a special attention to higher-level competencies.

Trends in Demography

Three trends were pointed out, which have major consequences on the future of the HE/R system.

- The EU population is dramatically ageing. From now until 2025 the proportion of youth under 20 and that of older beyond 60 in the total population of the Union will be reverted. One of the major consequences for the HE/R the massive intake of older students that can be expected in the future, which will requires an in-depth adaptation of the HE/R system to cater to those students with specific needs and characteristics.
  - Whereas the EU population is ageing, almost half of the world population is under 27, and this proportion could be even higher around 2050. In some developing countries, almost 2/3 of the population will be under 27. The ageing problem will affect not only the student population but also faculty staffs. The HE/R system will be faced with large numbers of retirements in a short period of time and they might find themselves in big trouble at that time to renew retiring staffs. This will increase the competition for staff among HE/R institutions.
  - Finally, for sociological and economic reasons, we have been attending a phenomenon of "massification" of education as the participation rate has dramatically increased for four decades. This raises tremendous challenges, in particular in terms of learning environment and teaching methods.

Confidence Crisis in Science and Education

It can be hypothesised that we are facing a peculiar paradox. On the one hand, science and education are somehow expected by many to solve most of the major problems of our society. On the other hand, there is a growing doubt, suspicion, or disappointment about their capacity to do so effectively. Science and education vocations and institutions are gradually losing their social and moral aura.

Main Challenges

Large Student Numbers Are There to Stay

Since the 1960's, the HE/R system has shifted from an elite system to a mass system, with on-going growth of enrolments and diversification of student population in terms of SES background.

- Increase of older people with demands for HE qualifications (this older age groups is to grow rapidly in size and proportion, the rise of the knowledge society entails more leisure time, changes in labour market entail growing demand for employability, hence for HE qualifications)
- Increase in the proportion of women
- Increase in (youth) population intake from outside EU with demand for HE qualifications

An Increasingly Diversified Student Population

Due to demographic and sociological factors outlined above (1.3, 2.1), the student population is to become increasingly diversified in terms of SES background, ethnicity, gender, age, … and scholarly background (=> entry skill levels)

More Competition for Students, More « Student Consumerism »

For several reasons, competition among HE institutions for students is likely to increase in the next years:
- Student mobility is enhanced by the Bologna process and English appears to be the emerging transnational language in EU.
- Additional measures for widening access (e.g., APEL) will also facilitate student mobility not only among HE institutions but also between these and other.
- On the other hand, in a context of scarcer resources for HE institutions, students are regarded as a critical source of income both indirectly and indirectly.
- This may also entail the rise of a "consumerist" attitude ("I pay, I demand") among students.

More Responsiveness of the HE/R System to Market Demands on Educational Provision

The HE/R system as a whole is becoming more responsive to the market, for both economic (increasing competition for private funding interacting with declining public funding, increasing competition for students) and ideological reasons (quest for legitimacy of the HE/R system in society in a context of confidence crisis).

This responsiveness affects HE programmes in terms of curricula, teaching methods, access and relationship to external partners.
- More emphasis on competency-based education, professionalisation and employability in curricula.
- Increased emphasis on professionalisation and competence in curricula stimulates the development of more "authentic" teaching methods, such as problem-based, or project-based, learning (PBL), ICT-based interactive instructional devices, "alternance", etc.
- Growing recognition of prior experiential learning (work experience) in access to programmes.
- Noticeable initiatives of partnership established between HE institutions and external partners in the development, management, funding and/or teaching of specific HE programmes.

More Responsiveness of the HE/R System to Market Demands on University Research

This trend has deep effects upon the development of research in HE/R institutions. Those effects could be described as the "research industrialisation" syndrome (Moriau 2001). They could be summarised as follows:
- Growth of applied research and development activities at the expense of basic
- Less autonomy and more public accountability and external regulation of the research activity
- Less assessment of the research activity and outcomes by peers, more multiple considerations in research assessment

- Less focus on academic- or discipline-driven research issues, more focus on problem-based, interdisciplinary research
- Research is less an individual process, conducted in a single site, it is now becoming more a collective process conducted by heterogeneous teams bound in more or less loosely coupled networks, with various types of partners, including from outside the academia, in multiple sites

Diversification and Differentiation of the Agents and Functions of the HE/R System

The HE/R has taken on board an increasingly wide variety of functions and agents over time, and this trend is not likely to stop. The production of knowledge through research and the transmission of knowledge through teaching have become more diversified.

- Research has been broken into a wide variety of activities ranging from basic research to applied research, development, evaluation, and technological innovation in an increasing variety of disciplinary and interdisciplinary fields.
- The teaching mission has also diversified. Now, HE institutions educate the citizens, train the worker and/or prepare to graduate education, train researchers or professionals through graduate education, teach young students preparing for life, "second-chance" adults who a (re)entering the HE system to obtain a first HE degree, or highly qualified professional seeking to update their skills in their field or wanting to prepare a shift in their professional trajectory.
- Besides these traditional functions, HE institutions provide expertise services (evaluations, counselling, consultancy) to public or private clients external to the HE/R system, they promote and manage spin-offs, hospitals, and sometimes whole "scientific parks.

In addition, a wider variety of agents have become involved in the conduct of those activities.

- Research is also conducted outside of the university: in specialised public or private research centres, in business firms, in non-profit organisations, and sometimes in non-university HE providers, to mention only these.
- Likewise, business firms organise their own advanced education and training programmes, sometimes taking the name of "academia or university", partnership are established between universities and external (private or public) partners to design, manage, fund and/or teach some programmes, etc.

Threat to Social Cohesion in Access and Academic Achievement

From the trends identified so far, we can anticipate very contrasted effects on social cohesion with respect to access to HE and academic achievement. The issue is important on the assumption that anyone should be given equal chance to get access to research-based HE and education for research, on the basis of merit and not be discriminated on the basis of gender, ethnicity, SES, age or disabilities.

Both opportunities and threats can be identified.

- Segmentation of the HE/R system could have the advantage of having HE/R that could be more suited to particular student constituencies like, for example, entities or institution specialised in the provision of programmes specifically suited to a "second-chance" student population. Likewise, the current emphasis on professionalisation in the educational provision may also be particularly attractive to adult students.

- But it was also argued that increased competition for students could also result in more selective access policies in some institutions that are not ready to pay the cost of investing in teaching quality with large and diversified student populations. Declining public support to HE may also result in increasing the student contribution to real costs (through student fees) and hence create barriers at entry.

Pressure to Accountability and Impact on Governance

HE/R institutions are increasingly submitted to external regulation and demand for accountability. This trend is not new but is obviously called to remain if not to strengthen.

- Institutions are increasingly accountable to the state. This may be seen as a paradox in times of declining public funding of the HE/R system. Pressure has grown to increase "productivity, with all the problems it may raise as to the ways of measuring the productivity of an HE/R institution.
- Accountability to the State is clearly increasing at national level but also at European level. This is true at least regarding research.
- Accountability is also increasing with respect to the students. Students now tend to enter the HE/R system more and more with a "tax payer" attitude, and in this context HE/R are forced to respond to it, or at least to adapt to this trend.
- Accountability also applies vis-à-vis the public-at-large, as represented for instance in the popular media. For example, the proliferation of "hit parades" of the "best" HE/R institutions in a given field that are published in newspapers and the institutions' sensitiveness to them.
- HE/R institutions are also increasingly accountable to the private sector (business firms in particular) as the importance of the agent is growing.

Accountability is embodied in a growing concern for "quality assurance" at both individual (faculty members) and collective (departments, schools, programmes, institutions) levels. It also deeply affects governance structures and practices.

More competition for faculty and research staffs

As mentioned above, the EU population is dramatically ageing, which has also consequences for HE/R staff: a large proportion is expected to soon retire in a very short period of time and the renewal will be problematic. Several factors (in particular, the EU policies towards more transnational convergence in the HE/R) will enhance competition among HE/R institutions, not only for students but also for faculty and researchers, especially in a context of shrinking supply.

Main indications for Future

1. Three Possible Attitudes towards the Trends Affecting the HE/R System

Three basic attitudes that can be taken by policy-makers regarding the observed trends and challenges, and the choice between these attitudes should at least partly affect the probability of occurrence of the scenarios presented below. The occurrence of one scenario over the other is primarily, *a matter of political choic*e.

- The first attitude ("Laissez-faire") consists of ignoring the observed trends or, at least to do nothing substantial about them, to let it go, for the best … or the worst. This is a "no prospective" attitude.
- The second attitude ("Active adjustment") consists of acknowledging observed trends, taking them for granted, anticipating the near future, and actively adjusting the system for the best possible fit to them. This is the "exploratory prospective" attitude.
- The third attitude ("Proactive" or "teleological") consists first of all to make political choices and set priorities as to the values, goals and ends to be aimed at by the HE/R system in the future. These choices may lead decision-maker to adjust and support some of the trends but also to actively resist and fight against some others. In this attitude, it is very important to accurately identify anticipate the trends in order to be able to design effective strategies to achieve the ends that have been set up for the HE/R system.

2. Three Possible Scenarios for the Future of the HE/R system

2.1. The "Melting-Pot" Scenario

The first scenario - The "Melting Pot" – implies a European context characterised by relatively low socio-cultural and economic diversity combined with a relatively high level of social cohesion. This fits the current context quite well, with its trend towards increasing supranational integration and its concern for equity in the distribution of wealth across social groups and regions/countries. In such a scenario, the HE/R system appears quite similar to what it is now, that is, a "hybrid" system that produces both:

- Private goods (e.g., undergraduate education and basic research);
- Public goods (e.g., continuing professional education, applied R&D and innovation in response to the demands of companies and administrations).

This scenario is very difficult to manage in the long run to the extent that the production of public and private goods implies basically very different production systems that cannot easily coexist. This scenario is most likely to occur if policy-makers take the "Laissez-faire" attitude towards the trends identified in Part 1 and if the current diversity/cohesion pattern does not change significantly.

2.2. The "Market Triumph" Scenario

This scenario is likely to become a reality if the rise of neo-liberal economy and the crisis of the Welfare State accelerate and eventually reduce social cohesion, whereas diversity diminishes. In this scenario, the impact of the market forces and the resulting trend toward privatisation and marketisation of the whole HE/R will predominate completely. Public agents (public universities and research centres) as well as typically public goods produced by the system (such as basic higher education for all and basic research) are gradually losing importance.
This scenario is most likely to happen if policy-makers choose the "Active adaptation" attitude toward most of the trends identified in Part 1.

2.3. The "Creative Society" Scenario

This scenario does not "naturally" follow the current major trends. It requires a "proactive" attitude, which implies that the whole behaviour of the HE/R system – whether in terms of educational provision or research production – is clearly driven from inside, by the system itself. In the third scenario, the HE/R becomes one of the key agents that influence society, it becomes a pillar of the growth of the knowledge society.

- *Educational provision.* In the Creative Society scenario public agents of the HE/R (i.e., public universities) will concentrate on the production of public "educational goods". It will concentrate on the provision of basic higher education for all. It is "basic" in the sense that the educational provision will focus on basic competencies and knowledge that are necessary for life in the knowledge society in a lifelong, "sustainable development" perspective, beyond the short-term demands of the markets. The "basic" higher education provision consists of both "initial" education and continuing education.
- In this scenario companies and other private agents should clearly be given the responsibility of providing "private" educational goods, in particular, specialised continuing education to fulfil the specific demands of the labour market. Society, and therefore the public HE/R system, should not be responsible and accountable to provide this kind of service that directly contributes to companies' profit.
- *Research Provision.* The same logic should also prevail with regard to the research production of the HE/R system. Public agents of the HE/R system should reinforce and concentrate on the "public" components of the current research production, that is:
    1) To stimulate the basic scientific research production in a holistic and interdisciplinary perspective;
    2) To facilitate the development of generic technologies;
    3) To sustain innovation in public utilities.

In other words, in the "Creative Society" scenario, it is assumed that universities and public research centres are in the best position to respond to collective scientific and technological needs. Whereas research centres from the private sector are in the best position to respond to the technological innovation needs of companies.

INTRODUCTION

The Expert Group's Agenda

A STRATA-ETAN expert group was set up in December 2001 with the mission to prepare a report on options to support European co-operation in Foresight for the development of Higher Education/Research (HE/R) relations in the perspective of the European Research Area.

On the basis of an in-depth analysis of the **current trends** that could be identified with respect to the various aspects of the HE/R system in Europe, the group has identified **major challenges** for the development of the system in the near future. Those challenges are key issues, questions, problems, that leave several options open for action and therefore call for political choices to be made at various levels (institutional, national, European). The analysis of trends and challenges led the group to sketch several possible global **scenarios** for the development of the HE/R system.

It must be underlined that the focus of the group's work is really on the future development HE/R **relationship in Europe**. It has not worked out a report on the development of scientific research in Europe nor has it worked a report on the development of the European HE system. Rather, it has examined the HE/R relationships, with special attention to in two aspects. One concerns the use of research in basic higher education (education of the citizen and the professional) and the other concerns the education and training of researchers.

It is also important to emphasise that the group's work was essentially **prospective**, not descriptive. In particular, the report does not provide a systematic review of the state of the art of the HE/R system and its context in Europe. Rather it examines the major trends that can be observed or anticipated and that are likely to shape the HE/R landscape in the next years, the questions they raise for thinking about the future of the HE/R relation and the options they leave for action to shape the future of the HE/R relation.

Moreover, the final report focuses on the **broad trends** that affect the HE/R system across Europe. It does not really account for the differences – although sometimes very large – across EU countries or regions, or between EU state members and accession countries. Although as mentioned, the group was not supposed to make a systematic review of the state of the art in the different countries, transnational differences are sometimes discussed when appropriate in the individual issue papers. The same comment applies to differences across disciplinary and professional areas within the HE/R system.

HE/R system should be understood here in a broad sense, which is certainly not restricted to universities. It includes that various institutional agents that directly participate in the production of knowledge (basic and applied research, technological development and innovation) and in the provision of any level of higher education (undergraduate, graduate, postgraduate and continuing education, in the arts and sciences as well as in the professions). These may include universities (whether public, public-funded, or purely private) of course, but also public and private HE schools, public and private research centres, non-profit education and/or research foundations, corporate universities and company research centres.

The 60 **members** of the expert group come from a wide variety of countries (EU State members, Accession countries, and Canada) and of disciplinary background. 22 of them wrote "issue papers". Each of these individual contributions deals with one (or a limited number of) aspect(s) of the HE/R relationship, in terms of trends, challenges and scenarios.

The other members of the group participated as discussants[1]. The expert group met four times, from December 2001 until May 2002. The last three **meetings** (26-27 March, 25-26 April, 27-28 May 2002) were devoted to discussions of the individual issue papers. Each of them has been revised at least once during this process. A **final report** was prepared by the rapporteur on the basis of the individual issue papers and the group discussions on those contributions. Preliminary drafts of the final report were submitted to the group and discussed, mainly in the April and May meetings.

Rationale of the group's work

In January 2000, the Commission adopted the Communication proposing the creation of a European Research Area.[2] This long term strategy aims at increasing the impact of research, technology development and innovation (RTDI) activities and policies in Europe, positioning RTDI policy as fully integrative part of the overall EU policy framework.

The broader context: the Lisbon Strategy and the European Research Area

The strategic positioning of EU RTDI policy has been highlighted in March 2000, when the Heads of State or Government and the European Commission it as one of the main instruments for implementing their common vision for economic and social development in Europe, the *Lisbon Strategy*. This strategy aims to make the European Union by 2010 *"the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion".*

In its first progress report for consolidating and extending the Lisbon Strategy[3], the **European Commission recommends**, as one of the key areas for action to be agreed by the European Council in Stockholm in March 2001, **to develop a European Research Area (ERA)** to identify excellence, to strengthen pan-European collaboration and to establish clearer and more consistent priorities for public research. It proposes that Council and Parliament should adopt by June 2002 the 6th Community Research Framework Programme to cement this new, more strategic and co-ordinated approach against the background of the increasingly interdisciplinary and inter-sectoral nature of research.

Strengthening the strategic basis of the European Research Area

Societies are more "knowledge-driven", markets have become essentially globalised, and market opportunities appear and disappear rapidly. This increases the difficulties to invest successfully in S&T, and to make the industrial and societal choices that turn these investments into innovation and quality of life in the long run.

Therefore, policy makers in the public and private domain depend more and more on reliable systems detecting relevant signals early, evaluating risks and opportunities of S&T developments comprehensively, and putting all in a system perspective.

The Bologna Declaration aims to create a European space for Higher Education, focusing on six action lines. The Prague Meeting has added three more actions.[4]

---

[1] *A list of participants is provided in Annex.*
[2] *COM (2000) 6 (18 January 2000) Towards a European research area*
[3] *COM (2001) 79 final: Realising the European Union's potential: Consolidating and extending the Lisbon Strategy. Contribution of the European Commission to the Spring European Council, Stockholm 23-24th March 2001*
[4] *See Bologna Declaration end Prague Meeting on…*

The European Commission "Science-society" Communication and the proposal for the next Research Framework programme.

The need for a coherent supportive framework is taken up by *"Science, society and the citizen in Europe",* the working document published by the European Commission in November 2000[5], by underlining the importance of science and technology foresight for the ERA implementation strategy. In particular, in order to systematically provide improved policy relevant information for the process of "open co-ordination" of national and EU research policies, Foresight programmes, initiatives and institutions might be better interconnected and geared towards European policies and issues, at transnational, interregional or European level, through new voluntary co-operation mechanisms. The need is emphasised to move further ahead to systematically strengthen the strategic basis of ERA:

> *"The supranational scale of many of the problems and the need to develop technological policies at European level, along with the scope for achieving economies of scale, call for:*
> - *platforms for disseminating the results of the national exercises and an exchange of experience,*
> - *joint Foresight exercises on certain common-interest topics,*
> - *and the development or continued development of technical tools on a European scale."*

The general suggestions to strengthen Foresight activities, outlined in the *Science-Society* document, have been further developed in the proposal of the European Commission for the next Community Research Framework Programme**.**[6] The necessity to successfully prepare and implement this new type of programmes shows once more the importance of a coherent supportive *Foresight* framework encompassing activities, which serve on the one hand RTDI policies at all levels in Europe, and on the other hand those EU policies that depend significantly on future developments in the RTD field. Activities of this kind aim at strengthening the ability to anticipate and to develop shared views on RTDI-related issues at stake for Europe. This goal can be achieved by exploiting the resources available more effectively, by progressively forming a common knowledge base on **Foresight development of Higher Education/Research relations** in Europe, by identifying gaps and proposing the necessary measures to fill them, to reach a coherent, high-relevance and high-impact institutional landscape for the building of an efficient Higher Education system in Europe.

This in turn would contribute to better informed decisions regarding the prioritisation and implementation of public and private policies, and higher consistency between EU, national and regional/local policy levels.

The Expert group: Developing Foresight for Higher Education/Research relations to strengthen the strategic basis of the ERA

As part of the work programme of Directorate RTD/K, an expert group is suggested exploring in depth options for developing Foresight for Higher Education/Research relations to strengthen the strategic basis of the ERA.

---

5 SEC(2000) 1973 (14.11.2000)
6 COM (2001) 94 final (21.2.2001): Proposal for a Decision of the European Parliament and of the Council concerning the multiannual Framework Programme 2002-2006 of the European Community for Research, Technological Development and Demonstration activities aimed at contributing towards the creation of the European Research Area

Objectives

The central topic of the Group of experts is foresight reflection on both movement of:

- ***renewal of the structures and programmes of higher education*** (mainly universities and engineers' schools) ***in response to or under the purpose of the dynamics of the research activity*** ;
- ***contribution of research*** as a training activity ***in the continued enrichment of the knowledge acquired*** by students.

These topics cover the following questions:

- What are the new fields of knowledge, which emerge at the border of scientific and technological research (including the HSS) as well as in practice of the economic and social actors (various forms of expertise)? How do these new fields codify themselves and do they professionalise themselves?
- How this continuous emergence is taken into account in the disciplinary and organisational structures (departments, units of teaching, etc.) as much as in the curricula (structure, topics, teaching equipment, evaluation methods of the acquired knowledge, etc.) in higher education?
- In this context, what is the role of the higher education institutions in the field of the training in new jobs "knowledge high intensive" which are determined by the needs of the economic world, of public policies or of civil society in the broad sense? How conversely training through research widens the knowledge acquired by the young academic/engineer?   How similarly the production of new knowledge and expert opinions in professional practice are transformed into "lifelong learning" and codified (cf. For example "business or companies universities " and "knowledge management")?
- What can the European Union suggest to stimulate on the one hand exchange of good practices between the Member States (open co-ordination) and to experiment innovative approaches within the framework, in particular, of the European research and education-training programmes?

Based on the aforementioned considerations, the expert group will have the task to **prepare a report on options for supporting a broad spectrum of Foresight for Higher Education/Research related activities**.

The final report

The final report is strictly based on the individual contributions produced by the group members and the meeting discussions. It is organised in four parts.

- **Part 1** deals with the major trends that can be identified in the HE/R system's social, economic and cultural context and their consequences – in terms of trends and challenges - for the HE/R system as a whole.

- **Part 2** focuses more specifically on one aspect of the HE/R relationship, that is, the use of research in the education of the citizen and the professional, in the context that has been sketched in Part 1. It deals mainly with trends and challenges concerning the curriculum, pedagogy, faculty development and institutional support issues.

- **Part 3** deals with the education and training of researchers. It examines the major trends and challenges concerning mainly the curriculum and pedagogy, as well as the institutional framework.

- **Part 4** presents three scenarios for the future of the HE/R system on the basis of the analyses developed in the first three parts. It is argued that the likelihood of these scenarios partly depends on the policy-makers' attitude toward the current trends that affect the HE/R system (three basic types of attitude are briefly presented).

- **Annex 1** presents the list of the participants in the expert group and **Annex 2** includes all the individual contributions (final versions of the "issue papers") produced by the group participants.

As mentioned, the final report is based on the individual issue papers. However, to make it as readable as possible, there is no reference at all to those contributions in the text. Nor there are references to the numerous authors and figures mentioned in those papers.

PART 1

THE FUTURE OF EUROPEAN HE/R IN CONTEXT

1. RELEVANT MAJOR CHANGES IN THE HE/R SYSTEM'S CONTEXT

1.1. RISE OF GLOBALISATION AND MARKET FORCES

- **Crisis of the « Nation-State »**

  The globalisation of markets (with growing interdependence of national economies), the rise of individualism as a dominant ideology (whose main consequence is a wide process of privatisation in the production's policy of goods and services), an unpreceded dissemination of new technologies, combined with the supranational integration mechanisms (including the European construction process), has gradually eroded the power of the "Nation-State" in Europe, in many areas. National economies, social policies, cultures, public utilities such as education, transportation, media, and healthcare, to mention only these, are increasingly submitted to powerful supranational influences while national states are gradually losing part of the control they have traditionally exerted in those areas. The very notion of citizenship[7] has gradually lost its original meaning, which had identified the citizen as a member of a nation in the first place. National identities are now losing their power and giving way to more diversified and multidimensional identities.

  One can be sceptical as to the fact that HE has ever really functioned as an effective agency of national integration and citizenship so far. Nonetheless, in the context of mutations mentioned above, there might be even more doubts that HE will ever be able to fulfil such a function. The recent moves of the EU in the area of HE/R (Bologna Declaration, Lisbon Strategy European Research Area) show the extent to which the HE/R system across Europe is increasingly viewed and taken by political and institutional leaders as an agent of European supranational integration. This trend will have major consequences for the system, mainly in terms of transnational convergence of the HE/R system, competition among HE/R institutions for students, staffs and resources, and mobility of students, researchers and staffs.

  This being said, some limitations to this trend can be identified. First, the gradual loss of power of the Nation State also generates some opposition and has given rise to regionalist or nationalist movements that are capitalising on the problems and frustrations globalisation may sometimes raise on the national scene, as recent history has shown in some European countries[8]. Secondly, and more importantly, a distinction should clearly be established between citizenship as promoted by institutional and political leaders, at both national and European levels, and citizenship as actually perceived and experienced by … citizens. This distinction draws our attention to the fact that the trend towards more supranational integration and citizenship as promoted by policy-makers does not necessarily coincide with the perception and experience of the citizen in all social groups.

---

[7] *Citizenship has to be considered from two points of view : the state, recognizing rights to the citizen, but also the citizen recognizing his belonging to a Nation.*
[8] *See Scenarios 2010 European Commission.*

- ## **Erosion of the « Welfare-State »**

  Another consequence of the above mentioned changes is the relative reduction of the role of the state in the market regulation along with a downward trend in public funding in many sectors, including HE and Research. It must be clearly emphasised that both the extent and the forms of this phenomenon vary widely across European countries, depending on their history and sociological pattern regarding the role of the State in society. Nonetheless it is a general trend that can be presently observed or anticipated almost everywhere in Europe. This is observed in the growing (total or partial) privatisation of sectors that have traditionally been within the prerogatives of the State, including education. In HE and Research, this phenomenon is observed in the increasing involvement of external private agents (such as companies), in funding, management, operation and/or assessment of the research production and educational provision, and in the relative decline of public (funding) support to HE/R system in many European countries (at least per student capita). It is of course difficult to determine whether the involvement of private agents has increased because the involvement of the state has decreased, or the other way around. In any case, both phenomena coexist and interact. The trend towards some deregulation of the HE/R market is also observed in the growing market-like competition between HE/R institutions and the greater governance autonomy that have acquired from the state. It can also be observed in the trend of marketisation of knowledge, of considering research and education as "private" goods, which can be bought and sold by and for particular interests.

- ## **Rise of neo-liberal ideology and practices**

  The rise of the market economy has been associated with liberal ideology and organisational practices that have more or less deeply penetrated many sectors of society, including education and research. Business-like management practices (such as, for example, the development of accountability procedures and regulations underlying the resource allocation or the accreditation process, the growing importance of assessment practices and culture), values, symbols and even rhetoric are affecting in HE/R institutions. The rise of individualisation of learning paths that is observed in HE (see below, Part 2, Section 1.4) can also be interpreted in the light of this trend.

  Again, differences may be observed in this respect among countries and types of institutions, but this is a broad trend that must be taken into account to understand the evolution of the HE/R system.

1.2. RISE OF KNOWLEDGE SOCIETY

As pointed out in Fontela's contribution, "Knowledge Society is a […]society based on production and dissemination of information that increases individuals and companies' knowledge". This has also benefited to States. According to the author, it has several characteristics, which distinguishes it from Nineteenth and Twentieth Centuries Society.

- It has deeply changed the relationships between labour, leisure and education. The proportion of time available for education and leisure is significantly increasing, whereas the three activities tend to coexist throughout life. This is to deeply affect the role of education and HE in particular, in terms of access (more and wider access, which result in both "massification" and diversification of the student population) and in terms of provision (development of continuing education beside basic undergraduate and graduate education in a lifelong learning perspective)

- It requires more and more higher-level job qualifications ("brain workers"), that is, both advanced knowledge in specialised areas, but also generic and complex cognitive, social and emotional competencies). This will influence the content and structure of curricula, and therefore learning environment and teaching methods, not only in professionally or vocationally oriented programmes, but also in all programmes, including in the arts and sciences.
- In such a society, knowledge is growing at exponential rate, technologies and work environment and demands are changing more and more rapidly. The nature and organisation of labour is getting more and more complex. In such a context, workers need not only to have learned a lot but also, above all, to have learned to learn. This is the notion of "educability". They must have the capacity not only to adapt but also to be creative in rapidly changing work environments. This is the notion of "employability", or, even better, "sustainable employability". Again, this has major consequences for HE curricula, as it points to the development of employability-related competencies as opposed either to specific skills responding to the short-term demands of the labour market in a given area, or to competencies that are not really useful to work and live in knowledge society.

This whole notion of knowledge society at this point of history is partly becoming a reality and can reasonably be expected to be more so overtime, but it largely remains an ideal in the current situation. On the one hand, large segments of European workforce are very far from possessing the type of competencies emphasised above and are very little likely to acquire them. On the other hand, it must be acknowledged that a significant proportion of jobs do not fit the picture at all and remain closer to the Taylorian model than to the knowledge society model. Turning to the HE/R system, it must also be pointed out that the idea of thinking of curriculum and instruction in terms of competence, with a special attention to those higher-level competencies that were mentioned above is far from reality.

Nonetheless it is important to keep this scheme in mind, which could be considered partly as a fiction at present but that might very well become a reality soon.

1.3. TRENDS IN DEMOGRAPHY

Three trends must be pointed out, which have major consequences on the future of the HE/R system[9].

- The EU population is dramatically ageing. From now until 2025 the proportion of youth under 20 and that of older beyond 60 in the total population of the Union will be reverted. According to Eurostat, from 1995 until 2025 we will observe a decrease of 9.4 millions of youth under 20 and an increase of 37.2 millions of older people. One of the major consequences for the HE/R the massive intake of older students that can be expected in the future, which will requires an in-depth adaptation of the HE/R system to cater to those students with specific needs and characteristics.
- Whereas the EU population is ageing, almost half of the world population is under 27, and this proportion could be even higher around 2050. In some developing countries, almost 2/3 of the population will be under 27. This reason, among others explains why we can expect increasing migration flows in the near future, especially of young population from outside EU, which could compensate for the decrease of the European youth population.

---

[9] *Based on the contribution of OECD to the Expert Group*

Even though, there are currently strong forces of resistance against immigration from outside EU, the intake of youth from outside EU will be come necessary for Europe. This raise a huge challenge for the European HE/R, which will have to make significant effort to be more attractive to foreign students and offer life and study conditions that are suited to their needs and characteristics. The ageing problem will affect not only the student population but also faculty staffs. The HE/R system will be faced with large numbers of retirements in a short period of time and they might find themselves in big trouble at that time to renew retiring staffs. This will increase the competition for staff among HE/R institutions.

- Finally, for sociological and economic reasons (demand for higher-level qualifications from the labour market, overall rise of the standard of living of the population, etc.), we have been attending a phenomenon of "massification" of education as the participate rate has dramatically increased for four decades: the proportion of participation within age groups has increased, and more age groups (more older) have been participating. To give just a few figures, according to OECD, the access demand has increase by 40% from 1990 to 1998. The number of adults over 30 returning to HE after a first HE degree is about 18%.. This has dramatic consequences for HE, as it has brought a far more diversified student population into HE as well as big numbers. This raises tremendous challenges, in particular in terms of learning environment and teaching methods.

1.4. CONFIDENCE CRISIS IN SCIENCE AND EDUCATION

It can be hypothesised that we are facing a peculiar paradox. After World War II, science and education were somehow expected by many to solve most of the major problems of our society. More recently, there is a growing doubt, suspicion, or disappointment about their capacity to do so effectively. Science and education vocations and institutions are gradually losing their social and moral aura. These sectors are more reluctantly supported by public funding. Support from both public and private stakeholders is increasingly associated with accountability procedures and regulations. The whole system is getting more and more accountable to society at large for the effectiveness and efficiency of its contribution to progress and well being[10].

2. IMPLICATIONS FOR THE EUROPEAN HE/R SYSTEM: CURRENT TRENDS, ISSUES AND CHALLENGES

2.1. NUMEROUS AND MORE DIVERSIFIED STUDENTS

Since the 1960's, the HE/R system has shifted from an elite system to a mass system, with on-going growth of enrolments and diversification of student population in terms of SES background. In the next decades, due to demographic factors (see 1.3) and sociological reasons (knowledge society) we can expect a significant decrease in the 18-25-student population in Europe, but this should be compensated for by an anticipated:

- Increase of older people with demands for HE qualifications (this older age groups is to grow rapidly in size and proportion, the rise of the knowledge society entails more leisure time, changes in labour market entail growing demand for employability, hence for HE qualifications),
- Increase in the proportion of women,

---

10 *Emphasized in the group discussions by the European University Association, in line with the Bologna process.*

- And increase in (youth) population intake from outside EU with demand for HE qualifications.

Moreover, these demographic trends will result in increasing diversity of the student population in terms of SES background, ethnicity, gender, age, … and scholarly background.

Challenges

These major changes in the student demography raise very difficult challenges for the HE/R. The key question is whether it will be able to accommodate to both much larger numbers of students and more diversified student constituencies. This question concerns all aspects of the educational provision - curriculum, teaching and assessment methods and format, ICT environment, institutional setting, access policies, etc. (see Part 2, Section 1.4 for more details).

2.2. MORE COMPETITION FOR STUDENTS, MORE « STUDENT CONSUMERISM », MORE COMPETITION FOR FACULTY STAFF

For several reasons, competition among HE institutions for students is likely to increase in the next years:

- Student mobility is enhanced by the Bologna process and there is a chance that English might *de facto* become the emerging transnational language in EU. This trend is opposed by those who want to promote multilinguism as a key vector of European integration in a way that accounts for the diversity of identities and cares for avoiding the marginalisation of some countries.

- Additional measures for widening access (e.g., APEL) will also facilitate student mobility not only among HE institutions but also between these and other providers (firms and vocational education providers).

- On the other hand, in a context of scarcer resources for HE institutions, students are regarded as a critical source of income both indirectly (through student fees) and indirectly (through student-based public funding formulae).

- This may also entail the rise of a "consumerist" attitude ("I pay, I demand") among students.

At the same time, for several reasons (e.g., ageing of the population, supranational convergence of the HE/R systems, etc.), competition for faculty and research staff is also likely to increase dramatically among HE/R institutions. This trend will probably make excellence in research (both research production and research training) a key stake in the competition among HE/R institutions. These will therefore be pressed to invest resources in priority into research, which might be conflicting at some point with the necessity to invest resources into teaching quality As mentioned above, the EU population is dramatically ageing, which has also consequences.

Challenges

- Those changes regarding students have major consequences, some of them in the forms of dilemma for HE/R institutions.

➢ The intensity of the competition for students in the next year cannot be predicted with certainty. Clearly the factors mentioned above will enhance competition but there are also strong forces that should reduce or attenuate transnational competition (e.g., national regulations for the exercise of some professions, which make it virtually impossible for someone of a given country who graduated from a university in another country to exert the profession in his or her own country.

➢ The intensity of the transnational competition for students may vary depending on the field (e.g., professional vs. academic, social sciences vs. "hard" sciences, etc.), on the level of study (1st, 2d or 3rd cycle) and age groups (young vs. adult students).

➢ Under the hypothesis of heightened competition for students, it can be predicted that quality learning environment (curricula, teaching methods, extracurricular environment, programme management, administrative staff, etc.) will become a more important stake than is currently the case.

• This is likely to raise a major dilemma for institutions.

➢ Indeed, investment in quality of learning environment is costly, especially, given the large numbers and diversity of the student population (faculty development policies, teaching, supervision and counselling staff, curriculum development, physical facilities, etc. See below Part 2 for more details). It is costly for both institutions and faculty members.

➢ Now, in times of scarcer resources, if an institution chooses to make this investment it necessarily diverts resources from other functions (research, services), which happen to be also suffering from resource decline. More investment in teaching may also undermine the institution's attractiveness to faculty seeking to invest in research in priority, which might be costly in times of increased competition for faculty members[11]. Likewise, if a faculty member chooses to spend time and energy in improving teaching, it will be at the expense of other missions (research and services.

• Institutions have different options to tackle the dilemma.

➢ They could therefore choose not to invest more in teaching, but then it might weaken its position on the student market if competition for students increases.

➢ Another option is to develop very selective access policy so as to be able to develop quality learning environment at lower cost (because selectivity brings about smaller numbers and more homogeneous student constituencies), at least if enrolled students contribute a larger part to costs through fees. In this case, there is a cost in terms of democratisation and social cohesion in access to HE.

➢ The generalisation of the use of ICT in teaching (e.g., distance learning) could also be seen by some institutions as a promising way to provide large numbers of students with quality teaching without diverting resources from research.

➢ Yet another option, at a more macro level, could be to increase the segmentation (if not hierarchisation) among HE/R institutions in terms of functions (teaching-oriented vs. research –oriented institutions; undergraduate vs. graduate institutions), student constituency (internationally, nationally or locally oriented institutions) and/or quality. Therefore, increased competition for students could be seen as an indirect source of segmentation of the HE/R system.

---

[11] It is also a consequence of the demographic ageing of the population. Faculty members will soon become a scarce resource which will increase competition for faculty across HE/R institutions.

2.3. MORE RESPONSIVENESS OF THE HE/R SYSTEM TO MARKET DEMANDS ON EDUCATIONAL PROVISION

The HE/R system as a whole is becoming more responsive to the market, for both economic (increasing competition for private funding interacting with declining public funding, increasing competition for students) and ideological reasons (quest for legitimacy of the HE/R system in society in a context of confidence crisis).

This responsiveness affects HE programmes in terms of curricula, teaching methods, access policies (this will be further developed in Part 2) and relationship to external partners.

- More emphasis on competency-based education, professionalisation and employability in curricula, not only at the graduate and postgraduate levels (growth of advanced professional initial and continuing education) but also at undergraduate level (see the Bologna declaration).

- Increased emphasis on professionalisation and competence in curricula stimulates the development of more "work-relevant" (i.e., emphasising relevance to the "real world" of work)[12] teaching methods, such as problem-based, or project-based, learning (PBL), ICT-based interactive instructional devices, "alternance", simulation, etc.

- It also results in growing recognition of prior experiential learning (in particular, work experience) in access to programmes.

- This trend has also resulted in noticeable initiatives of partnership established between HE institutions and external partners (business firms, professional associations, non-profit organisations, public institutions) in the development, management, funding and/or teaching of specific HE programmes. This is now quite usual in the area of continuing education. Some HE institutions even have a specific staff devoted to that mission of establishing and strengthening this kind of partnership in HE provision.

Challenges

- Educating competent and "employable" professionals has often been seen as incompatible with what is seen as another essential mission of HE, that is, educating critical and active citizens or as incompatible with the ideal of academic freedom and independence.

  o This view has been embodied in the tight segmentation between:
    ➢ undergraduate education and graduate education (with graduate education focusing either on academic preparation for graduate education or on general/liberal arts education of the citizens, and graduate education focusing on advanced education of professionals or professional researchers),
    ➢ between graduate education for professions and graduate education in the arts and sciences (preparing for the research profession),
    ➢ or in some countries, between professional education delivered by universities and vocational education and training delivered by "higher" schools.

---

12 Educationalists call this type of teaching methods « authentic ».

o With such a perspective, one option dealing with the observed trends regarding professionalisation of the whole HE curriculum is to strengthen segmentation of the HE/R system by function, for example, with HE institutions specialising in "LA" undergraduate education, in "professionally (if not vocationally)-oriented" undergraduate education, in undergraduate academic preparation for graduate education, in research-oriented graduate education, or in advanced professional education.

- A totally different perspective is to question the underlying assumption of incompatibility between the two missions (producing educated "critical" citizens vs. producing competent professional) altogether and to focus on core competencies that appear to be crucial to both missions.

  o This approach is supported by recent research that shows remarkable convergence between those competencies that are reported by employers and graduates to be central to employability in the context of knowledge society and economy and those that are traditionally praised as central to the academic ideal of educating critical citizens. It also appears that exposing students – even at undergraduate level – to research may significantly contribute to the development of this type of competencies. This point is further elaborated below (Part 2, Section 1.2; Part 3, Section 1.1)).

  o This approach argues for maximum integration and continuity between professional and general education, undergraduate and graduate education. This position calls for two comments however.

    ➢ Firstly, the idea of compatibility between the "employability" and active/critical "citizenship" goals holds only to the extent that "employability" is understood in the sense explained above of "sustainable employability", that is, the mastery of those basic cognitive, social and affective competencies that enable the professional to perform effectively, creatively and critically in the long run in rapidly changing work environments. The problem is that very frequently the notion of employability is used in a much more restrictive (Taylorian) sense of mastery of vocational skill that enable the professional to fit to the short term demands of a given work environment. The latter meaning is not only different, it is also essentially incompatible with the former, and indeed incompatible with the academic ideal of university education.

    ➢ Secondly, the idea that the goal of educating for "sustainable employability" is compatible with the academic ideal of educating for active and critical citizenship does **not** mean that the latter should or can be reduced to the former. In other words, being an active and critical citizen may indeed imply to be a competent "employable" professional (as defined above), but cannot be reduced to that. What is meant however is that the generic competencies involved in "sustainable employability" are basically close to those involved in active and critical citizenship in other areas of life.

- Despite a possible convergence of some common fundamental competencies, the question of balance and relationship between general education and professional education remains complex and cannot be solved by simplistic responses.

2.4. MORE RESPONSIVENESS OF THE HE/R SYSTEM TO MARKET DEMANDS ON UNIVERSITY RESEARCH

This trend has deep effects upon the development of research in HE/R institutions. Those effects could be described as the "research industrialisation" syndrome[13]. They could be summarised as follows:

- Growth of applied research and development activities at the expense of basic research (as a result of increasing funding from firms and declining public funding of research)

- Less autonomy and more public (and to some extent, private) accountability and external regulation of the research activity

- Less assessment of the research activity and outcomes by peers, more multiple considerations in research assessment (in particular, policy relevance as assessed by policy makers and sponsors, involvement of more and more diverse actors in the assessment process (see EU-funded research evaluation procedures)

- Less focus on academic- or discipline-driven research issues, more focus on problem-based, interdisciplinary research

- Research is less an individual process, conducted in a single site, it is now becoming more a collective process (more and more internationally), conducted by heterogeneous teams bound in more or less loosely coupled networks, with various types of partners, including from outside the academia, in multiple sites

Challenges

This trend raises key questions for the future
- It becomes more and more necessary to question the longstanding distinction between "basic" and "applied" research, or between "research" and "development".
- ➢ Firstly, because in practice there is a wide variety of research activities proliferating between – or aside - these two poles. Some big international research programmes consists of a complex; closely knitted, intertwined research activities ranging from technological development to truly basic research and involving various types of partners and expertise. These programmes are neither pure basic research, nor applied, development or innovation projects, they are all that at the same time.
- ➢ Secondly, in this perspective, creative basic research as such paradoxically appears *useful* to applied research, development and innovation in virtue of its disinterested character. Conversely, applied research, development and technological innovation can make progress only to the condition that it is regularly fed by disinterested basic research.

- Under the assumption of an essential opposition between basic and applied research, two problems may arise in the light of the "research industrialisation" trend.

---

13 Moriaux, J. (2001). « L'industrialisation de la recherche ». In J. Allard, G. Haarscher, & M. Puig de la Bellacasa, L'université en questions, Brussels, Labor, pp. 50-77.

> ➢ First, universities or other institutions doing "basic" research may take a defensive position and strive to "protect" basic research against the pressure to more applied research. The problem then in this position is that institutions are confronted with declining public funding for basic research and cannot really claim for private funding (except in a "patronage" perspective). Moreover, they could enhance the diffuse perception of the university as an "Ivory Tower" in society.
> ➢ The opposite option is to blindly follow the trend and forego basic research at all. The problem in this position is that, although it can pay off in the short run, may lead to a dead end in the long run to the extent that applied research, development and innovation cannot make any progress if they are not fed in by, articulated with and grounded in basic research.

- One option to get out of the dilemma is twofold:
> ➢ to *secure* the conditions (advanced training, physical facilities, staff, funding) for a sustained development of basic research and research in new "high-risk" fields – e.g., through securing public funding
> ➢ and to develop and strengthen networking and synergies among partners specialised in specific forms of research, which includes appropriate partnerships with the private sector.

2.5. DIVERSIFICATION AND DIFFERENTIATION OF THE AGENTS AND FUNCTIONS OF THE HE/R SYSTEM

The HE/R has taken on board an increasingly wide variety of functions and agents over time, and this trend is not likely to stop. First, it traditional functions – the production of knowledge through research and the transmission of knowledge through teaching – have become more diversified.

- As noted above, research has been broken into a wide variety of activities ranging from basic research to applied research, development, evaluation, and technological innovation in an increasing variety of disciplinary and interdisciplinary fields.

- The teaching mission has also diversified. Now, HE institutions educate the citizens, train the worker and/or prepare to graduate education, they train researchers or professionals through graduate education, they teach young students preparing for life, "second-chance" adults who a (re)entering the HE system to obtain a first HE degree, or highly qualified professional seeking to update their skills in their field or wanting to prepare a shift in their professional trajectory.

Besides these traditional functions, HE institutions also fulfil a variety of specific missions that compete with the other two.

- They provide expertise services (evaluations, counselling, consultancy) to public or private clients external to the HE/R system, they promote and manage spin-offs, hospitals, and sometimes whole "scientific parks". They are also, sometimes, engaged in scientific popularisation activities (extension courses, summer schools for the public at large, courses for senior citizens, etc.

In addition, a wider variety of agents have become involved in the conduct of those activities.

- Research is also conducted outside of the university: in specialised public or private research centres, in business firms, in non-profit organisations, and sometimes in non-university HE providers, to mention only these.

- Likewise, business firms organise their own advanced education and training programmes, sometimes taking the name of "academia or university", partnership are established between universities and external (private or public) partners to design, manage, fund and/or teach some programmes, etc.

Fontela (pp. suggests a typology describing the different categories of functions and agents of the HE/R system (pp. 2-5). It distinguishes three major functions:

- to produce and transmit knowledge (Basic HE and Basic Research),
- to develop basic/general competencies (Higher professional education, Doctorate education, and Generic applied research),
- and to develop specific skills (Advanced training in new technologies and Research for innovation).

It also distinguishes three types of agents of the HE/R system:

- Agents of public sector (Public universities and specialised schools, Public research centres),
- Agents of non-profit private sector (Foundations for HE and research),
- and Agents of profit private sectors (Private universities, Private R&D centres, Corporate universities, Company research centres).

Challenges

This trend raises crucial problems too for the HE/R system in the near future. The fundamental question in the background is what HE/R institutions finally want to do in priority? What do they consider their most important role(s) in society? And what does society expect from them?

What is problematic in this question is the contradiction between two demands that must be reconciled. On the one hand, the HE/R is expected to do more and better for society. On the other hand, the system is more than ever confronted with increased competition. Therefore, excellence becomes a priority but at the same time, the quest for excellence inherently requires to concentrate on a restricted set of activities. It is impossible for a university to remain excellent on the academic or the research market if it seeks to do everything.

- One approach for HE/R institutions is to continue to take all these functions on board and strive to cater for the needs and demands of all the various constituencies with which they interact.

  - The problem in this perspective is twofold.
    - First, it takes the chance to become a "multiversity", scattered into a myriad of different activities and commitments and eventually unable to fulfil any of them properly. In other word, it takes the chance to "lose its soul".

- Second, this chance is even more serious in a context of scarcer resources, which imply that exercise of one function is necessarily at the expense of the others. Doing everything is not sustainable in such a context, which requires severe arbitration. In addition, this position is likely to weaken the institution's position is a context of high competition for students, faculty and funding since it cannot highlight any real specific strength.

o One option to attenuate this problem consists of maximising internal segmentation, by specialising internal entities (departments, institutes, schools, centres, etc.) and/or individual faculty members in one or a limited set of functions. One example is the organisation of US universities in a separate undergraduate college, professional and graduate schools, with separate faculty staffs. This solution at least allows for more effectiveness in the exercise of the various functions. The risk of "atomisation" remains however, which eventually may harm quality. For example, what does it imply to have undergraduate courses taught by a professor who is not (or no longer) an active researcher?

o Between the "tambourine man" and the "monomaniac" professor types, another possibility consists of:
  - encouraging faculty members to fulfil more than one function – e.g., typically, to do both research and teaching, both graduate and undergraduate teaching) and at the same time
  - establishing clear priorities in the functions to be exerted by faculty members depending on the characteristics of the individual (competencies, interests, advancement in the career, etc.) and the environment (resources and support available, etc.)
  - and assisting the individual faculty member in the management of these functions through various institutional ways (adequate reward system, mechanism of collegial management of individual workload, ongoing assessment, professional development support, etc.).

o At a more collective level, a maximum functional differentiation of entities within the HE/R institution requires a governance structure that secure co-ordination and integration mechanisms in order to be effective and avoid atomisation.

- The options presented so far assume that a single institution can take on board a variety of functions. An alternative approach consists of maximising functional differentiation *across* institutions. Institution in this scenario would be specialised or differentiated in relation to one or more criteria such as: geographical area (location and constituency), functions (e.g., research vs. teaching oriented institutions, universities vs. research centres, undergraduate vs. graduate or professional schools), or fields of research and/or study.

- The problem in this option is the necessity of super-ordinate mechanisms of co-ordination and co-operation. More fundamentally, the problem that is raised in the "segmentation" option is the balance between competition and co-operation. This problem becomes acute when it comes to the question of access to resource in a context of resource scarcity. It raises the issue of institutional governance (e.g., is the consortium option a good one?) but also that of the regulation role of the state (at both national and EU levels), and the balance between state and market regulation. It also raise the question of institutional bridging mechanisms such as the APEL national policies in UK which facilitate mobility across work, HE and vocational education, or the "passerelles" system between universities and "higher schools" in Belgium..

- Another problem with cross-institutional segmentation is the unavoidable risk of hierarchisation and stigmatisation.

- The first approach, which promotes internal diversity, should certainly resolve those serious problems, but is clear that it requires certain conditions §(in terms of co-ordination mechanisms and investment of resources) to be effective. In any case, it is clear that the HE/R as a whole need clarification of the role of the agents with regard to the different function identified: who does what? Who is responsible for what? Who is accountable to whom for what? … And who pays what?

2.6. THREAT TO SOCIAL COHESION IN ACCESS AND ACADEMIC ACHIEVEMENT

From the trends identified so far, we can anticipate very contrasted effects on social cohesion with respect to access to HE and academic achievement. The issue is important on the assumption that anyone should be given equal chance to get access to research-based HE and education for research, on the basis of merit and not be discriminated on the basis of gender, ethnicity, SES, age or disabilities.

In the picture we have described so far, both opportunities and threats can be identified.

- Beyond any political or ideological rationale, the context of increased competition for students (Section 2.1-3) forces HE/R institutions to open their doors to a wider variety of students and, with some reservations explained above (ibid.), to invest in the improvement of learning environment that can better cater for the needs and characteristics of a more diversified student population, hence to facilitate academic achievement for a wider variety of students. Segmentation of the HE/R system could also have the advantage of having HE/R institutions (or internal entities) that could be more suited to particular student constituencies like, for example, entities or institution specialised in the provision of programmes specifically suited to a "second-chance" student population. Likewise, the current emphasis on professionalisation in the educational provision may also be particularly attractive to adult students (regardless of qualification levels).

- However, there is another side of the coin. It was argued that increased competition for students could also result in more selective access policies in some institutions that are not ready to pay the cost of investing in teaching quality with large and diversified student populations. Declining public support to HE may also result in increasing the student contribution to real costs (through student fees) and hence create barriers at entry.

The trend to teach large student numbers may be detrimental to students who require special attention and support. Segmentation of the system may also be induce more segregation, with some categories of students oriented to some "2d-class" institutions and excluded form "elite" ones. Moreover, some learning environments that tend to develop nowadays (e.g., typically, distance learning) require a strong capacity of autonomy on the part of the student, as well as a range of competencies that could be socially and culturally biased. If this problem is not acknowledged and catered for, the risk is that such environments de facto penalise those who have had the chance to develop those competencies previously in their family or at school[14].

Challenges

- The fundamental question at issue here is whether we want to give priority to elitism and excellence at all costs, including the cost of social exclusion? Or do we want to give priority to social cohesion at the expense of excellence in both the research and the education provision? Or yet do we reject this dilemma and strive to reconciliate the ideal of academic excellence and that of social cohesion and democratisation of access to HE?

- For those who share the third position, several avenues can be quickly identified.

  o One is to examine the barriers and opportunities for access, at the entry level. Preparatory programmes (with focus on affective and motivational as well as cognitive components), APEL scheme provisions, financial support, appropriate information and marketing policies, could be appropriate to minimise barriers and maximise opportunities for access.

  o Appropriate pedagogical support (see Part 2), competency-based curricula, appropriate balance between individualisation of learning and group support, practical organisation of programmes (in terms of schedule and location for example) could also be effective ways of supporting academic achievement of more vulnerable students throughout their studies.

- Further research would be needed to identify of the fine-grain mechanisms of discrimination that may operates both at the entry level and throughout the course of study.

2.7. PRESSURE TO ACCOUNTABILITY AND IMPACT ON GOVERNANCE

HE/R institutions are increasingly submitted to external regulation and demand for accountability. This trend is not new but is obviously called to remain if not to strengthen. In addition, is also striking to observe that accountability of the HE/R system is extending to a wider variety of agents.

- Institutions are increasingly accountable to the state. This may be seen as a paradox in times of declining public funding of the HE/R system. The resources allocated are scarcer and HE/R institutions are under scrutiny as to the use they are making of those (scarcer) resources. Pressure has grown to increase "productivity" ("to do more and better with less"), with all the problems it may raise as to the ways of measuring the productivity of an HE/R institution.

- Accountability to the State is clearly increasing at national level but also at European level. This is true at least regarding research. EU becomes an increasingly important

---

14 (See Bourgeois's contribution)

source of funding for research but the counterpart for HE/R institutions is their submission to a particularly tight external control over the research issues to be addressed, the research process and practice, the research outcome and its dissemination.

- Accountability is also increasing with respect to the students. As already pointed out (Section 2.3), student consumerism is growing. Students now tend to enter the HE/R system more and more with a "tax payer" attitude, and in a context of increasing competition for students, HE/R are forced to respond to it, or at least to adapt to this trend. A good example of this is the increasing importance of student assessment of courses and programmes.

- The notion of accountability also applies vis-à-vis the public-at-large, as represented for instance in the popular media. It is striking to observe, for example, the proliferation of "hit parades" of the "best" HE/R institutions in a given field that are published in newspapers and the institutions' sensitiveness to them, in times of tightened competition for resources.

- Last but not least, HE/R institutions are also increasingly accountable to the private sector – business firms in particular – as the importance of the agent is growing, not only as a source of funding of HE and R activities and institutions, but also as a partners in the conduct of those activities.

Accountability is embodied in a growing concern for "quality assurance" at both individual (faculty members) and collective (departments, schools, programmes, institutions) levels. It also deeply affects governance structures and practices (systematic use of quality assessment procedures and growing importance of quality assessment in decisions about individuals and organisational units, professionalisation and quantitative growth of administrative staffs, professionalisation and growing importance of academic governance tasks, etc.).

Challenges

- On the positive side, accountability to external societal agents contributes to increasing the visibility of the HE/R and consideration for the crucial role it can play – as knowledge producer and transmitter and disseminator in knowledge society. It contributes to make HE/R institutions more key agents of socio-economic and cultural development and less "ivory towers". More practically, it also provides a socially acceptable basis and mechanism for regulating resource allocation in a context of scarcer resources and hence enhanced competition for faculty, student, funding … and social legitimacy. At a more internal level, it also has the merit to clarify what the priorities in the institutions really are – as far as the reward and resource allocation system (at both individual and collective level) appears to be really consistent with the quality assurance system.
- On the negative side, the danger is to constraint the system – in the definition of its research and educational priorities, practices and outcomes – to such an extent that it does no longer have the necessary independence and freedom of action to achieve genuine creativity and excellence in the response it is expected to provide society with. Now, and this is a fundamental paradox that was already underlined about the basic vs. applied research debate (see Section 2.5), the HE/R system can be the most useful to society if it is not alienated to demand from society, it can enjoy sufficient freedom and autonomy to deal with complexity and eventually to provide society with genuinely critical, creative - hence useful - responses to its complex questions and problems.

- The major challenge is therefore to find and work out accountability procedures and criteria that can preserve enough academic autonomy and freedom and account for a definition of "quality" that can accommodate the academia and at the same time provide an effective and fair basis for making resource allocation decisions both within and across institutions. This is very difficult for various reasons.
  - First, it is of course not easy to reach an agreement between the academia and external stakeholders as to a definition of the priorities in the HE/R missions and quality in the performance of those missions.
  - Moreover, the academia itself is also deeply divided on those critical questions. As long emphasised by sociologists of academic organisations, the academia can be best characterised as a sort of federation of loosely bound "academic tribes", with different and sometimes conflicting, cultures, practices and views on the world. In such a context, it is not easy to reach consensus on a definition of the priorities of the mission of the HE/R system and of quality in the performance of those missions. Consensus is not too difficult to achieve as long as ones remains at the level of vague and abstract statements as to role of HE and R in society. It is far more difficult when it comes to defining specific assessment criteria and procedures, and ultimately making specific decisions concerning the allocation of resource across different institutions, units and/or activities.
  - It is also costly. Designing, operating and enforcing more and more accountability regulations and procedures take time and high-level expertise. It requires the development of a professional administrative staff and facilities. It also increases the pressure on faculty staffs to perform academic governance tasks and functions, both in terms of time, energy and expertise. To be a faculty dean nowadays is extremely complex and time consuming. Again, in times of scarcer resources, the resources allocated to accountability are necessarily diverted from the system's core missions, which leads to a strange paradox as quality assurance may sometimes jeopardise achievement of quality!
  - The development of a professional administration in academic organisations may be a major source of conflicts as emphasised by Clark (1981). The professional administration conveys values, culture, practices which are essentially quite remote (if not discrepant) from the academic professional culture and the growing interference of the former with the latter is often resented by the latter as a threat to academic freedom. At the same time, given the growing pressure to accountability to external agents and external regulations, a strong professional administration provides the academics with a sort of buffer that protect them from external interference. In other word, it is often perceived as a "*mal nécessaire*" with rather mixed feelings associated with it.
  - It should also be noted that accountability and quality assessment as both a culture and a set of practices may be more or less in keeping with the dominant academic culture and tradition in some countries and quite discrepant in others.
  - Finally, it is also difficult to determine the appropriate organisational level at which accountability should be managed and promoted: Individual? Departmental? Faculty? Institution-wide? Regionally? Or nationally? Or at EU level? It is also important to clarify the nature of the relationship between the quality assurance system and the reward/resource allocation system. Is the former there only to provide feedback and indications without any constraining power? Or does it clearly and formally provide the ground to make resource allocation decisions (for example, to determine the budget of a research unit, to cut a HE or a research programme, or to close a department)?

PART 2

EDUCATION THROUGH RESEARCH

INTRODUCTION

The objective of parts 2 and 3 is to examine some of the consequences of the trends described in Part 1 for two major aspects of the HE-R relationship: the use of research in the education of the professionals and citizens (Part 2), and the education, training and professional development of professional researchers in HE/R institutions (Part 3).

One of the major (and longstanding) missions of HE/R institutions is to provide the youth with education in the arts and sciences to become both "enlightened" citizens and competent professionals, either at a basic level (undergraduate education) or a more advanced level (graduate and professional education). In the Humboldtian perspective, it is assumed that this education is best achieved if it is provided in close interaction with research. In this perspective, teaching and research are performed within and by the same institutions (i.e., most of the time, universities) and even by the people who are exerting both activities (teachers are also researchers and the other way around). The idea is to assure that students are exposed not only to the most up to date knowledge in the disciplines (produced by research) but also to mind sets and intellectual discipline that characterise the practice of research. This point is often put forward to specify the difference between HE provided by HE/R institutions and HE education provided by more vocationally oriented institutions (non-university higher schools, etc.). What are the implications of the trends examined in Part 1 upon the exercise of this mission in HE/R institutions for the near future?

1. LEARNING WHAT CONTENT AND WHAT COMPETENCIES? THE CURRICULUM ISSUE

1.1. RESPONDING TO THE INCREASING CONCERN FOR "SUSTAINABLE EMPLOYABILITY". TOWARD COMPETENCY-BASED EDUCATION

One of the consequences of (1) the changes in the HE/R system relationship to the markets and to the state and (2) the rise of knowledge society is an increasing pressure exerted upon HE/R system to promote "employability" (in the sense explained above in Part 1, Section 1.2) of graduates. This emerging trend is likely to deeply affect the traditional approach to curricula, pedagogy and learning assessment in HE. It upsets traditional approaches to HE curricula in at least in three ways.

- It enhances shift from learning content to learning *competencies* in relation to content. It forces to design curricula on the basis of a definition of what competencies professionals in the field are expected to master rather than what set of knowledge is the most important for the discipline. In such a perspective, the acquisition of knowledge is definitely still important, but only as "tools" serving the learning and the exercise of a competence rather than as an end in itself. Designing and structuring curricula in terms of competencies rather than content represents quite a break from a longstanding tradition.

- It enhance shift from an exhaustive approach to specialised knowledge to focus on the "essential" core knowledge. Knowledge is exploding and obsolescence is accelerating at very high rates. It has therefore become impossible and pointless to teach all the knowledge produced at some point in a given field. Rather, it has become necessary to focus teaching on what can be seen as the essential knowledge in the field, that is, the body of knowledge that can serve in the long run as foundations on the basis of which new knowledge can be built and learned later on, on a lifelong basis. This approach applies within the disciplines but also across disciplines. Morin's (2000) and other's (…) attempts to define such knowledge foundations provide responses to this important question.

- Likewise, this approach forces programmes designers and teachers to define what they consider as the core competencies to be learned in priority to become competent and "employable" professional in a give field. In this respect, it is also worth trying to define core competencies across disciplines and core competencies that are specific to the field. P. Knight and J.-J. Paul discuss la short list of competencies that have been identified as crucial to employability by extensive research on employability. Knight also reports interesting efforts at national level to define core competencies in various disciplines and professional fields.

    ### Challenges

    The actual implementation of such an approach to curriculum raises important questions and problems for the future.

    - First, as already pointed out, it represents a major break from a longstanding tradition. It therefore requires time, energy as well as expertise on the part of faculty staff, which they are not necessarily willing or able to invest in curriculum development activities. To that extent, the governance and academic leadership is crucial here. Are faculty really recognised and rewarded at both the institution and at the department level for a significant investment in that type of activity? It is also typically a collective work, which again poses the questions of the institutional conditions that permit and facilitate such a collective work?

    - Second, as already pointed out (See Section 2.4 above) educating for employability is often perceived in opposition to educating for "enlightened" citizenship or for preparing for entry into graduate education. This conception is very salient in the debate around the aims of the first cycle as proposed in the Bologna scheme. Many faculty members express their fear that emphasising an employability orientation in the first cycle is likely to jeopardise the essence of undergraduate education and is often resented and rejected as a real threat to the essence of academic values. However, as already argued, striking similarities can be observed between those basic competencies that are reported by employers and graduates in many countries as crucial for employability and those that are most often associated with those "academic values".

    - Third, it also questions the traditional segmentation between undergraduate and graduate education. Instead of reserving the employability concerns to graduate and advanced professional education and seeing undergraduate education only as a preparation for graduate education or for general education of the citizen, it suggests:
        o to approach curricula at all levels in terms of competencies and to think what specific competencies are to be targeted at each cycle of study in each field,
        o to think the sequence in terms of progression toward mastery of complex competencies,

o to think about the appropriate balance between general education (developing core competencies in a broad array of disciplines, that is, to favour breadth over depth) and specialisation (developing core competencies in a specific discipline, that is, to favour depth over breath) at the different level of study and in the different fields (balance between majors and minors).

It also addresses the question of the optimal degree of freedom of choice that is let to the individual student in the determination of his or her curriculum at all levels of the cycle (balance between core curriculum and electives).

1.2. RESEARCH AS A GROUND FOR EMPLOYABILITY-ORIENTED HIGHER EDUCATION

When taking a close look at the type of core competencies that appears central to employability (critical thinking, analysing, arguing, independent working, learning to learn, problem-solving, decision-making, planning, co-ordinating and managing, co-operative working, etc.), it appears quite clearly that the old humboldtian emphasis on the virtues of research-teaching cross-fertilisation remains surprisingly relevant in the current context. It is very striking that the list of "employability" competence overlap quite largely with the competencies involved in the exercise of the modern research activity. Therefore, embedding research into the curricula through the HE curriculum, is likely to contribute to the development of those competencies than can be valued in many professional sectors other that professional research. In other word, education through research may be quite relevant and useful to education to other professions than research.

Challenges

- This perspective raises a difficult challenge. Indeed, it clearly implies that HE courses not only at the graduate level *but also at the undergraduate level* are taught by teachers who are also active researchers in the disciplinary field.

  However, this is clearly discrepant from the current trends observed in some prestige HE/R institutions to maximise institutional segmentation between undergraduate (taught by a separate faculty staff recruited for their excellence in teaching, but who are not necessarily active researchers themselves and managed by a separate institutional unit entirely dedicated to undergraduate education) and graduate education (taught by top researchers and managed by institutional units dedicated to both research and graduate education). It should be noted that the opposite trend is also observed in other prestige research-oriented universities, where top researchers may also teach at undergraduate level and performance undergraduate teaching is highly valued in the faculty reward system.

- Again, this issue questions the academic governance and leadership implemented in the institution: does it really encourage researcher to invest some of their time, energy and competence in undergraduate teaching?

- Having HE courses taught by active researchers is a necessary but not sufficient condition. It is also necessary to implement learning environments (teaching methods in particular) that makes the mind-sets that are typical of the research activity salient in the learning process. In other words, a researcher might teach a course and yet not communicate a researcher attitude towards knowledge. Researcher can teach a body of knowledge in a dogmatic/uncritical manner.

1.3. PROMOTING INTERDISCIPLINARITY IN BOTH TEACHING AND RESEARCH

A consequence of the emphasis on employability in HE is to prepare graduates to solve problems in a given field of practice. By essence, this call for greater emphasis on interdisciplinarity in HE programmes.

Challenges

- Two positions could be defended with a view to promoting interdisciplinarity.
  - One could state that interdisciplinarity is extremely complex and to perform effectively in an interdisciplinary team or approach to problems, one has to be first trained to achieve excellence in one single discipline.
  - The opposite position would state that on the contrary, learning to perform effectively in a multi-disciplinary approach to problems should be learned as early as possible.
- Another problem is that interdisciplinary teaching should be supported by interdisciplinary research, which is most often quite problematic in many HE/R institutions, because the institutional structuration of the research activity and the funding mechanism remains deeply disciplinary-based.

1.4. ADJUSTING TO CHANGES IN THE STUDENT POPULATION: DIVERSITY, NUMBERS AND CONSUMERISM

1.4.1. Dealing with individualisation of learning paths

The conjunction of the trends in the student population – increased mobility, large numbers, more diversity and rise of consumerist relationship to HE – is likely to create pressure for individualisation of curricula, leaving the individual student with a maximum freedom to determine is or her own learning path towards the degree across courses, programmes, departments and maybe institutions (within or across countries). E-learning could be a way to respond to this trend, but certainly under the condition of high quality requirements and openness to the use of all or most of the languages and not only English. This trend should also be enhanced by the spreading use of ICT in HE. It could be an effective way to deal with large enrolments, more diversified student profiles and more consumerist attitudes.

Challenges

- Individualisation of learning paths, although quite suited to accommodate the recent trends in the student population also has its costs.
  - In particular, it can jeopardise the *coherence* of the curriculum and ultimately the quality of the education received, at least in a competency-based perspective. Defining the core competencies to be mastered at the end of a given curriculum implies that all of them are actually mastered by the end of the programme, which in turn implies participation in all the activities designed to acquire those competencies.
  - In addition, individualisation makes it difficult for the individual student to benefit from group support in interactions, which could be problematic for more vulnerable students who may need social support more than others.
  - It also makes autonomy and self-regulation capacities more crucial to academic achievement, whereas those capacities may be particularly sensitive to SES background.

- One option between the two extreme schemes – maximum individual choice vs. core curriculum for all – is the "individual learning path" scheme. In this scheme, students have the choice between several predefined paths towards the degree. Those paths are designed so as to maximise coherence. This approach in fact combines a high level of curriculum structuration and a medium level of student determination.

1.4.2. Dealing with more adult students

One important aspect of the diversification of the student population in the HE/R system is the growing proportion of adult students. Two issues must be distinguished here. One is the issue of widening access to basic HE for adults who have not had the chance to complete a HE degree before and hence come to get a first HE degree (generally at undergraduate level). They are sometimes called "second-chance" students. Another, very different issue concern those adults who have already complete one (or more) HE degree in the past and return to HE (generally at graduate or postgraduate level) to deepen or widen their qualifications.

These are quite different adult student populations with generally distinct sociological profiles and educational needs. The major questions therefore are: How can the HE/R system adequately cater to the specific needs of these new populations? And to what extent are these needs compatible with each other and with the needs of the youth student population? More fundamentally, responding to the needs of those two populations refers to two distinct missions of the university: contributing to social cohesion by facilitating access of socially excluded groups, and contributing to socio-economic development by providing advanced continuing education in the professions. Both missions however, relate to the mission of the HE/R system to be an agent of lifelong learning for all.

Challenges

Addressing adult students raises major challenges for the HE system.

- One is how can students' life and work experience be taken into account and incorporate into the learning process? This question can be addressed at different levels.

  o At the entry level, it raises the difficult issue of accreditation of prior experiential and work learning (APEL). This in turn requires competency-based curricula and admissions policies

  o At the course level, it questions the instructional methods and learning environment: how to mobilise and fruitfully use learners" experience into learning? How to make them elaborate fruitful links between what they learn in courses and what they have learned from prior experience? Likewise, one could question the appropriateness of individualisation of learning paths with the need for group support that seems to be so important for learning, especially with "second-chance" students? Etc.

  o At the assessment level, it raises the question how to assess the students' capacity to link theory and practice, their prior knowledge and the knowledge taught in the course, etc…

- Another challenge concerns the appropriateness of the institutional and organisational format of learning, in terms of course schedules and locations, student services, libraries, etc. Are they suited to the specific characteristics of adult students with (most of the time) an occupation, a family, and other commitments?

- The remarks above would lead to design distinct programmes for an adult student constituency specifically. Now, a very problematic question concern the combination between programmes addressing adult students in priority (or exclusively) and other programmes for 18-25 students. Again, to what extent should institutions push segmentation of programmes, staff and organisational units to cater to both adult and youth students? Some institutions seem to prefer to integrate as much as possible both student constituencies in most programme, others, have developed distinct programmes (or tracks) for these two population, whereas many have developed intermediate policies. This problem is also somewhat different for "second-chance" students and for "returning" students.

2. HOW TO TEACH/LEARN EMPLOYABILITY-RELATED COMPETENCIES? THE PEDAGOGY ISSUE

Although much remains to be done in this area, extensive educational research has been done to characterise factors and best teaching practices and learning environment that are to facilitate learning of employability-related higher-order competencies. Key dimensions have been suggested to identify those practices. One is the degree of authenticity of the proposed learning environment, that is, its relevance to "real world" settings (in particular work settings). The other is the degree of "cognitive apprenticeship", that is, a teacher-learner relationship characterised by a certain form of guidance and tutoring of the learner by the teacher or the tutor in problem-solving learning tasks.

ICT-based learning environment may certainly contribute too to the development of those higher-order competencies, but only if they involve some form of direct (through tutorial activities) or indirect interaction (e.g., through Internet group forum) and social support.

It should also be emphasised that the question of learning assessment is at least as important as the question of instructional design. Employability-related competencies are not only complex to learn but also complex to assess. Again, educational research on this topic can be very useful in the development of complex learning assessment schemes.

Challenges

- However effective they can be for the learning of employability-related complex competencies, those teaching practices and learning environments also have costs to be considered with care.
  - They are not very well suited to very large groups that can typically be found in the first years of undergraduate education. As they are based on intensive interactions among peers and between learners and tutors/teachers, they become quite costly in terms of staff, facilities, learning material, preparation time, etc. [15]

---

[15] *Again, the problem here is a problem of choice, priority setting and arbitration in resource allocation: is the institution ready to see academic achievement in a competency-based framework as a priority such that it deserves the allocation of resource there that cannot be allocated to other functions? In some countries like Belgium, with a very open access policy at the entry of the HE system, institutions are confronted with huge student groups (hundred of enrolments in some fields) in the first year of their undergraduate programmes, with very high failure and drop out rates by the end of the first year (in some cases they can reach 60 %). In such conditions, some institutions are very reluctant to invest resources in improving teaching in the first year knowing that the actual student selection occurs at the end of the year. This reluctance is grounded in the assumption that most of the dropout and failures are related to motivation and orientation problems rather than learning problems and therefore, pedagogical effort at that level is very little efficient and effective. The problem is that it is extremely difficult to scientifically validate such an assumption. In any case, the alternative option is to invest in both curriculum, pedagogical design and specific orientation and counselling activities in order to facilitate orientation and mobility in the first year of undergraduate education. Unless institutions choose to use student selection*

o Even with smaller numbers of students it is clear that implementing this kind of learning environment on large scale is costly in many respects: for the faculty staff (in terms of time and energy spent on designing and managing this type of environment, and on professional development and training activities) and for the institution (adequate physical facilities, teaching, tutoring and teaching assistance staff). In fact, implementing this kind of learning environment without being really ready and willing to invest the required time, energy, money, and expertise is most often worse than keeping more conventional practices in terms of learning output and morale.

Again, the problem of costs raises the difficult question of arbitration among competing investments, both at individual and departmental level. …). It also most often requires a collegial investment of a whole faculty staff in a given programme or department. In fact, most of the time, an isolated pedagogical initiative that departs from the dominant practices in the department is very difficult to sustain in the long run. Collegial investment in teaching development also requires a conductive institutional environment in terms of governance and leadership.

- Another problem lies in the fact that high degrees of "authenticity" of learning environment is inherently far more difficult to achieve in some fields (dealing with inherently more abstract knowledge, such as Maths or Physics) than others (essentially more practically-oriented, such as, e.g. Engineering or Medicine.

- Moreover, these teaching practices in a way or another always demand more autonomy and independent learning capacities on the part of the students. This may raise two problems.

  o First, in some countries, it is quite clear that students coming out from secondary schools are not well-prepared and trained to independent learning.

  o Second, some categories of students may be disadvantaged compared to others in terms of prior acquisition of independent learning skills. This is the case of those students from lower SES background who may not have had the opportunity to develop that kind of skills in their family and/or in the school they attended.

At the HE level, this becomes a problem only if this difference is not given attention and catered for pedagogically. Autonomy and independence in learning is a very complex skill that requires a long and slow learning process. Now, too often, some faculty and academic leader are prone to see in ICT-based learning only a means to reduce costs in teaching (especially with large numbers) and to neglect the fact that to be effective this type of environment require even more resources and efforts than conventional environment in order to enhance the development of autonomy and independence in learning. It is one of the great paradoxes highlighted by theories of learning: learning to be autonomous and independent in learning requires intensive interaction and support in the first steps.

- It should be emphasised again that despite these aspects, the development of this kind of environment on a large scale is likely to strengthen the institution's position in the competition for students that promises to intensify in the next years.

---

mechanisms at the entry level (as in most elite institutions in many countries) in order to obtain smaller, more homogeneous and high level student groups from the beginning.

3. THE NEED OF FACULTY DEVELOPMENT POLICIES

So far we have emphasised the necessity to mobilise adequate resource in order to design and implement effective learning environments with a view to the development of those higher-order competencies underlying employability in knowledge society. Among those resources is the faculty's (and programme leaders') expertise for designing and managing this type of complex learning environments effectively. The problem is that this expertise must be learned. Professors in HE institutions have received a long and comprehensive education and training to become researchers but most of them have not specifically been trained to become teachers. Therefore, they tend to reproduce the teaching practices they have been exposed in the past or that they see around them, which happen to be relatively simple practices that are quite remote from the type of complex learning environment we have described above. To that extent, investing in teaching quality requires an investment in some form of faculty development policies. These can take various forms, from more or less informal counselling to participation in formal degree programmes. They can be operated by professionals specifically dedicated to this mission or by volunteer experienced teachers, they can be managed by dedicated centres within the institutions or by a staff in each department (or group of departments).

Challenges

Implementing a faculty development policy in a HE/R institution requires some specific institutional conditions. At least two can be underlined here.

- First, faculty development and more broadly teaching quality must been really seen a priority by the institution, so that it is ready to devote the adequate amount of resources to it and to implement a faculty reward system that actually enhance faculty's investment in faculty development activities. In some case, the institution can also choose to constraint staff (especially newcomers) as a condition for tenure or promotion. However, experience and research show that positive incentives are more effective than constraints.

- Second, substantial co-operative links must be secured between the faculty development practices and relevant educational research on HE teaching and learning. This raises the question of the faculty developers' own training and … professional development! It also raises the issues of institutional links and networking of HE teaching centres and relevant research centres.

4. THE NEED OF INSTITUTIONAL SUPPORT TO TEACHING QUALITY

On several occasions above, we have underlined the importance of institutional support to teaching quality in HE/R institutions. Such a support is crucial and raises challenges at four levels.

Challenges

- *At the individual level*: Does the faculty reward and accountability system (appointment, promotion, tenure) clearly set up teaching quality as one of the top priorities for the staff and actually encourage his or her investment in quality teaching and in faculty development activities? Are the individual staff members actually offered working conditions that make this investment viable and professionally and personally rewarding? Are they properly assisted in arbitration of priorities and investments?

- *At the department level*: it is widely acknowledge in the literature that the role of "middle management" is particularly crucial in the development of teaching quality. In particular, does teaching quality appear as a real priority for the department in actual resource allocation decisions (for example, decision about allocation of tutor or teaching assistant staff, or access to physical facilities, such as building or computing)? Does it appear as a priority in the actually implemented accountability system (does it actually encourage investment in both research and teaching or does it force single investments?)? Does it encourage collegial reflection and action regarding teaching quality (for example in the development of competency-based curricula)? Does it promote faculty co-operation in teaching (e.g., setting up teaching "pools" for major courses)? Does it encourage participation in faculty development on department scale?

- *At the institution level*: Support at this level is also very important. For example: has it implemented a faculty reward and accountability system that encourages individual and collective investments in both research and teaching or in only one of those activities? Does it promote segmentation or integration between institutional units and staff dedicated to undergraduate education to graduate education and to research? Has it implemented and does it actually support a faculty development centres and synergies between this centre and educational research centres? Does it promote maximum student selection at the entry or not? In case of open admission policy, is it ready to invest in teaching environment that are likely to promote academic achievement with large numbers? Does it promote orientation mechanisms in the first years? Does it have specific policies to accommodate for the needs of adult students? More fundamentally, to what extent does the institution behave or not on the twofold assumption that inter-institutional competition for students will increase in the near future and that teaching quality will be a decisive stake in this competition.

- Finally, *national policies* can also influence institutional behaviour about teaching quality, through both regulations and provision of expert support, e.g., for curriculum design. The example of LTSN in UK presented by P. Knight is a very interesting illustration of such policies. Likewise, *EU* can also play a role, by encouraging dissemination and implementation of good practices, contributions to the standardisation of appropriate curricula frameworks, and more fundamentally by creating the conditions for emulation and competition among institutions based on teaching excellence as well as research excellence.

PART 3

EDUCATING FOR THE RESEARCH PROFESSIONS

1. THE COMPETENCIES OF THE PROFESSIONAL RESEARCHER IN KNOWLEDGE SOCIETY: WHAT THEY ARE AND HOW TO DEVELOP THEM?

1.1. FOCUS ON CORE COMPETENCIES. TOWARDS MORE CONTINUITY AND INTEGRATION IN CURRICULA AND APPROPRIATE PEDAGOGY

Basically, the *core competencies* involved in the exercise of the research profession (critical thinking, hypothetico-deductive reasoning, co-operative skills, problem-solving, project management, information-processing, reading and writing, etc.) *are very similar* to those involved in other professions and in what could be expected from an "enlightened citizen" (as supposedly developed at undergraduate level). These are also *complex* competencies that are very long to acquire. Therefore, the development of those competencies should be aimed at *far before* the graduate level, that is, at the undergraduate level and even earlier at school. In addition, *continuity* and *integration* in (competency-based) curricula should be enhanced not only across educational levels – schooling, undergraduate and graduate (MA and PhD) education – but also across academic and professional fields. Another implication of this perspective is that research training should be definitely based and integrated in HE/R institutions when it is not yet the case.

Challenges

- The underscored need for more continuity and integration across levels and fields of study may be conflicting with the current general trend towards more segmentation within and across institutions. To take just one instance (others will be examined below), as emphasised above (see Part 1, section 2.1), increased competition can be expected among HE/R institutions in the near future. It is likely that competition – for both students and staff – will be even fiercer at the graduate education level, which means that *quality of research* should be an increasingly important stake in the competition. Therefore, for more efficiency and effectiveness, institutions may tend to promote specialised and autonomous institutional units devoted to both research production and training and separated (in terms of funding, staff, and institutional structure) from other units dedicated to professional education or undergraduate education. An important challenge is therefore to be able to reconciliate the demand for increased quality of research production and training and integration/continuity with other levels and fields of study.

- If the core competencies on target in the research training overlap widely with those that are aimed at in professional and undergraduate education, then the pedagogical principles that prevail for the latter (see Part 2, Section 2) should also apply to the former.
  - o The "authenticity" principle would imply that research students are given the opportunity to learn by doing in learning setting and activities that are as similar to "real" professional research settings and activities as possible.
    - It implies for instance that PhD research be part of the actual research activity being conducted by the lab to which the PhD student is attached.

- ▪ It also implies to give enough weight to the practical internship component besides the theoretical component of the training process.
  - o The "cognitive apprenticeship" principle would imply that research apprentices are supervised (or coached) on the job by senior researchers that are clearly dedicated to this task. However, the senior supervisor should not be the only partner in the supervision of the research apprentice. In this respect, the traditional German model of longstanding dependency of the PhD student on his or her "master" is clearly obsolete. Research students should benefit from formative interactions not only with one dedicated supervisor but also from a whole team.
- One of the challenges of this perspective is therefore to maintain an adequate balance between theoretical, content-oriented activities (courses, seminars and readings) and practical training, which are both jointly necessary to become a competent professional researcher.

1.2. FOCUS ON PROFESSIONALLY RELEVANT SPECIFIC COMPETENCIES AND APPROPRIATE PEDAGOGY

Beyond core competencies, research-training curricula should also aim at the development of *specific competencies* that are *relevant to* the research profession as it is now actually exercised in various contexts. To that extent, they should take into account the deep changes that have recently occurred in the actual practice of scientific research (see above on the "Research Industrialisation syndrome"). The current professional researcher is in many respects quite different from his or her alter ego 3 or 3 decades ago: he or she must be able to perform effectively in bigger, more collaborative, multi-partnership, more problem-oriented, more interdisciplinary research projects, he or she must be not only scholarly excellent in his or her field but also skilful in the various aspects of project management, and so on.

Challenges

- The development of those competencies that are relevant to the actual current practice of scientific research call for more "authentic" learning environment in research training. Those competencies typically cannot be acquired only in formal learning setting. Again, most of them can be learned only through a longstanding immersion "authentic" professional research practice.

- This calls for a more systematic policy of active involvement of research apprentices in labs and research networks. It also means more mobility of junior researchers in order to be exposed to the different aspects and contexts of the research practice in the field.

- This perspective can be seen as a real challenge because it requires a lot of resources (time, pedagogical expertise, manpower, and money) to create the conditions that can make the immersion of the research apprentice in practice a genuine professional learning experience. It is well known from learning theories, that learning by doing does not occur spontaneously. It requires a conducive environment and, in particular, conditions that enhance *reflection* on practice.

- One attractive approach to do this is to provide MA, or at least PhD students, with short- or medium-term job opportunities as junior researchers in a lab, which again, requires funding. Now, paradoxically, the resources to be invested in the development of appropriate learning environment for research training might be sometimes conflicting with resources that necessary for the development of research itself.

1.3. PREPARING FOR ENTRY TO EXOGENOUS AS WELL AS ENDOGENOUS JOB MARKET

As already pointed out (Part 1, section 2.6), HE/R institutions are losing their monopoly over the production of scientific research. More and more research is currently being conducted by "non-academic" institutions (companies, non-profit public or private organisations, private and public independent research centres, etc.) Therefore, researcher students should be trained and prepared to enter not only the endogenous academic market but also the *exogenous market*.

Challenges

- The perspective of preparing research student to enter the "non-academic" market is a true challenge. Currently, in most European HE/R institutions, graduate students are trained in an "endogenous" perspective, that is, on the assumption that most of their career as professional researcher would take place in an academic research setting. Preparing them for the exercise of the research profession in other contexts constitutes a fairly radical shift from current practice and mentality.

- Among other things, it could imply more involvement of the research apprentice in collaborative projects with "non-academic" partners and also more direct involvement of "non-academic" partners in the training of researchers (for example, they could be involved in the design and/or management of some university MA or PhD programmes, certainly in more applied areas).

- Another challenge for research training programmes (MA and PhD) in this perspective is to become more attractive to in-service professionals that could be interested to return to the university to acquire or update research skills to be used on the job.

1.4. COMBINING SPECIALISED TRAINING AND GENERAL EDUCATION

A tension is growing in the current evolution of the research profession, which have major implication for the definition of the competencies to be aimed at in research training. On the one hand, different factors are converging to push individuals, teams and institutions to specialise in increasingly narrow research areas. Among other things, this trend results from the conjunction of growing competition for excellence and knowledge explosion and complexity. Competitive excellence can be maintained only at the cost of higher s*pecialisation*. On the other hand, overspecialisation has also its cost in the long run, the cost of what Edgar Morin has call "mutilated and mutilating thinking". To be effective, the contemporary researcher needs to be not only excellent in his or her specialised area, but also to be able to work in *interdisciplinary* team, which requires to have some *general* theoretical, historical and epistemological education background in the field beyond specialised knowledge in the discipline. It also requires being able to *think critically* about his or her own research work (to be aware and critical about the *epistemological*, *theoretical*, *methodological* and *ethical* assumptions and implications of his or her work). A good knowledge of the history of sciences is also a crucial prerequisite for critical thinking in research.

Challenges

- There is a real challenge here for the education and training of the researcher. It is not an easy think to be able to find the appropriate balance between training in the area of specialisation and general education, including education in ethics and epistemology.

- It is difficult because reasoning only in terms of amount and balance of courses in a curriculum cannot be a solution. To add one or two courses in epistemology or ethics in the training of a researcher will not enable him or her to think critically about his or her discipline and research activity. This is rather a long and complex learning process that can be achieved only through an adequate balance of practical and theoretical activities.

- In this respect, it also seems to us that the "Doctoral school" model is a promising perspective, as it promotes advanced research training generally at the crossroad of different disciplines, with room for both general and specialised education and critical thinking about the research activity.

1.5. ADDRESSING ADULT RETURNING STUDENT TOO

As pointed out above (Part 1, Section 2.2), the higher education student population has become much more diversified, in particular as it includes a growing proportion of adult students. This trend affects not only undergraduate but also graduate and professional education. In particular, a growing number of in-service professionals are returning to the university to get (more) research training. This constituency has specific educational needs and demands that distinguish them from the typical 20-25 graduate students preparing for a research career. Generally, it seeks to acquire or update research skills in order to be more effective on their job, which may not be professional research, rather than to prepare for becoming a full-time professional researcher. As full-time in-service professional they have less time to devote to study, hence they usually want to study on a part-time basis are more reluctant to undertake very long studies, they have more schedule constraints, they carry a lot of work experience that could be valued and used in the training process, etc. This specific student constituency is likely to grow in the near future and should be more taken into account by HE/R institutions.

Challenges

- The perspective to address this new student constituency at the graduate and PhD level raises several difficult questions as to how their specific needs and demands can be accommodated effectively.
  - For example, it was argued that to be effective research training must provide an "authentic learning environment: students must be involved in "true" professional research activities and settings. This is of course not too difficult with a young full-time student, but it is far more difficult – for practical reasons – for a part-time student with a professional activity aside.
  - There is also the question of research job opportunities for this student constituency. Currently, at least in some countries, it is difficult to provide an adult student with a short- or medium-term job opportunity as junior researcher that would greatly contribute to his or her training. This person might not have to possibility to take a part-time or full-time leave from his or her current job and the age barrier in most universities often prevents adult from having access to junior research positions.

- Another challenge is to find the right balance in the accommodation of the needs of this student constituency and those of the conventional young (full-time) student population.

- In any case, this perspective call for more flexibility in the educational provision at the MA and PhD levels in order to accommodate a wider variety of needs form various student constituencies. It should also be noted addressing this new student constituency with work-based experience and concerns may also result – at least in some areas - in critically questioning the way research is being conducted and the choice of issues to be investigated.

2. WHAT INSTITUTIONAL FRAMEWORK FOR RESEARCH TRAINING?

2.1. MORE CONCERN FOR INTERNATIONAL COMPETITION AND ATTRACTIVENESS OF GRADUATE (MA AND PhD) EDUCATION

As underscored above (Part 1, Section 2.3), HE/R will certainly face increasing competition, for students and faculty staffs, among EU countries but also with countries outside of EU, in the near future. Now, it is very likely that such a competition will concern primarily the second (MA) and third (PhD) cycles of HE. They will be faced with the increasing necessity to be more attractive, not only to foreign students but also to local students in order to avoid the brain drain. This growing concern for attractiveness and competitiveness will concern European HE/R institutions both within and across Europe, but also European HE/R as a whole with respect to other countries (USA in particular). It will have major consequences that should shape the landscape of graduate and postgraduate education in Europe that are all real challenges.

Challenges

1. *Research excellence as a stake in the competition in graduate education.*
   It is fairly clear that the competition for the best students and staff at graduate education level will be largely based on *research excellence*.

   - One consequence of the search for excellence in research is the risk of investing resources in priority into research at the expense of teaching, into graduate education at the expense of undergraduate education.

   - Another likely consequence is increasing differentiation of both HE/R institutions and the HE/R system as a whole. The best "research" universities will tend to concentrate their resources on those specific fields where they can reach or maintain excellence, most of the time in close connection with other excellent universities in the field.

   - It may also lead to separating organisational units and staffs dedicated to different missions (for example different staffs and schools dedicated to undergraduate and graduate education respectively). Moreover, whereas those HE/R institutions that can afford it will concentrate their resources into the development of research excellence at the expense of other missions (such as undergraduate education), others may concentrate on other missions (such as teaching rather than research).

   The challenge is therefore twofold.
   - ➢ It is to be able to make the appropriate arbitration and articulation both between the research and teaching missions, and between the (post)graduate education and undergraduate education missions, *within*

institutions[16]. For example, one option is to have undergraduate education and graduate education programmes managed by different organisational units but to have partly common teaching staff with excellent researchers teaching in undergraduate programmes too).

➢ It is also to be able to achieve co-ordination and integration of an *increasingly differentiated European HE/R system* (see Part 1, Section 2.5). More fundamentally, European policies could significantly contribute to such an integration, under the condition that genuine co-ordination exists between the DGs in charge of research (DG 12 in particular) and those in charge of HE (DG22 in particular).

• Another consequence of the search for research excellence is the trend for the best "research-oriented" universities and research centres to get together in excellence networks, in order to strengthen their position in the competition not only on the European research market but also and especially on the world research market (with the USA in particular).

The challenge here is to foster the creation and development of such excellence networks through appropriate funding policies such as those that are planned within the 6th FP.

2. *Research training excellence as a stake in the competition in graduate education*.

Competitiveness of institutions at graduate level will certainly be based on excellence of the research activity and outputs. It is also very likely to be based on excellence of the research *training* provided at that level. PhD students and staffs could be attracted by those institutions that are well known for the quality of their research in the field but also for the quality of the training they provide to research students.

This may create some paradox and tension as developing an excellent learning and teaching environment in research training (as presented above, in Section 1) is quite demanding in terms of pedagogical expertise (a good research does not necessarily make a good research teacher or mentor) and other resources (manpower, time and money in particular).

3. *Attractiveness of the EU HE/R system to students and staffs from other countries* is also very much related to the achievement of transnational convergence and coherence of the system (see next section below).

Attractiveness and competitiveness of the European HE/R system depends not only on intrinsic characteristics *but also on external conditions.* For example, the current visa policy implemented in some European countries can be sometimes seen a serious obstacle by foreign students. It is clear that a user-friendly visa policy is a condition of attractiveness. Other factors, such as the quality of the information and marketing policy of HE/R institutions, or the financial support policies offered to potential students (and foreign students in particular) and the staff salary conditions may also play an important role.

---

16 (see above, Part 1, Section 2.3, Part 2, Sections 2 and 4).

2.2. TOWARDS MORE TRANSNATIONAL COHERENCE OF (POST)GRADUATE EDUCATION AND MOBILITY OF STUDENTS AND STAFFS

Whereas the HE/R system tends to become increasingly differentiated, there is also a deep trend towards more transnational coherence of the system. This also applies for the (post)graduate level. This trend results from the more global trend toward European integration and the various measures taken in this direction, such as the Bologna Declaration. It can also be viewed as a result of increased competition among HE/R institution both within the EU and between the EU and other countries and the rising consciousness in institutions and countries of the necessity to participate to the global coherence of the system in order to become or remain competitive. Likewise, more coherence of the system on European scale is also perceived as an effective way to promote mobility of students and staffs. The trend towards more coherence at the (post)graduate level is evident in the following changes of the system that are currently taking place.

- The generalisation of a common *curricula and diploma structure* promoted by the Bologna declaration (Bachelor/Master/PhD sequence) and subsequent agreements is clearly on its way. Interpreting Bologna Declaration, most EU countries are working actively towards a BA/MA/PhD model.

- The overall tendency in Europe is to have MA and PhD studies delivered by universities.

- This implies that the PhD studies is clearly anchored as the upper level of university higher education, which means that
  - PhD studies are part of the university curriculum,
  - a MA-level degree is required to enter PhD studies,
  - there is no other degree offered beyond PhD,
  - and PhD studies combine courses/seminars and research practice.

- The multi-disciplinary, multi-institutional, excellence-oriented "Doctoral school" model tends to prevail as an institutional format for PhD studies in Europe. This trends parallels the organisation of the best university research centres into excellence networks, as promoted by the 6th FP.

- English can be expected to gradually become the common teaching language at the (post)graduate education level (at least the PhD level) across European countries.

- To some extent, there is also an increasing convergence in terms of length of studies (3 years for a BA, 2 years for an MA and 3 years for a PhD) across countries, interpreting the Bologna Declaration.

- The ECTS systems is also being gradually generalised, including at the (post)graduate level.

- Funding of (post)graduate studies may tend to be increasingly based on student fees.

- The distinction between two major categories of MA degrees may tend to be generalised in Europe, that is, interdisciplinary or disciplinary on the other.

Challenges

This trend towards more transnational convergence of the HE/R system raises major challenges at the (post)graduate level.

- In the current situation, the system remain very disparate across countries, whether in terms of degree sequence, length of studies, institutional framework, access conditions and procedures, curricula, instruction, legal regulations,

funding policies, etc. For that reason, transnational convergence will certainly be at best a long and complex process.
The real challenge here is twofold:
➢ On the one hand, it is to aim at more coherence, or "harmonisation", rather than standardisation (uniformity);
➢ On the other hand, it is to find appropriate strategies towards this aim that take into account the present specific reality of each national system and factors that operate against convergence.
- To achieve this, many questions and problems have to be resolved.
  ➢ One condition for convergence that is particularly difficult to implement is the transnational recognition of degrees. This problem concerns MA degrees more specifically (international recognition of PhD degree is far easier to achieve). This is particularly true of professionally oriented degrees as many countries have their own legal regulation of the exercise of professions. Consequently, it may not be attractive for a student to take a professional MA degree in another country if it cannot give him or her access to the profession in his or her own country.
  ➢ Harmonisation of the degree structure is made difficult in some countries by existing policies. For example, in countries where most 2d cycle degrees presently take four years, the recommendations following the Bologna Declaration to have 2d cycle degrees in 5 years (2+3) requires significant additional public funding (one more year).
  ➢ The generalisation of the "Doctoral school" model for PhD studies also raises some problems.
    ♦ One is to keep the coherence and articulation with graduate studies in the departments, as doctoral school, tend to claim maximum autonomy. This problem is often acute when it comes to the question of who is authorised to deliver the final degree or to make decision about access.
    ♦ It also raises the problem of funding (what is the department-doctoral school relationship in funding?). Another problem concern the link between the areas of graduate studies (MA ad PhD) as embodied in degrees and schools, and the areas of research as embodied by departments, research centres, labs and networks. They may not overlap, which in that case may make it difficult to organise the immersion of the (post)graduate student in "authentic" research practice.
  ➢ The linguistic convergence toward English as the prevailing common language at (post)graduate education level raises at least two sorts of problems.
    ♦ One is that the EU countries an unequally prepared for this important shift, which means that some will be penalised in the competition.
    ♦ The other is that is will definitely put British universities in a better competitive position. Everything else being equal, a graduate student from any country will be more tempted to study in a British university, where he or she can benefit from immersion in a native English-speaking environment. Because of this advantage, the best British universities are likely to attract the best students, staffs and resources and therefore improve their research and education quality further. This may create a "virtuous circle" that might increase the gap between the top British universities and the top universities in other European countries.

  ➢ The role of the EC is of course crucial in promoting convergence of the HE/R system and mobility of students and staffs, through appropriate regulations, recommendations and funding policies. However, its effectiveness is partly conditioned by an optimal co-ordination between the DG (mainly 12 and 22) in charge of research and higher education.

> ➢ Another problem concerns those countries with a binary HE system (distinguishing universities and higher schools). In those countries, the question as to who is competent and authorised not only to do research but also to train researchers (especially at MA level) is a very difficult – if not conflictual – one. The future distribution of roles in this respect is far from clear at this point.

- In any case, more research on good practices of research training is needed. It would be particularly important to look at those national systems that have a longstanding experience of the BA/MA/PhD sequence (such as UK and the USA).

2.3. INCREASING PARTNERSHIPS WITH "NON-ACADEMIC" AGENTS

It was already argued that preparing researchers-to-be for entry, not only to the endogenous (academic) market, but also to the exogenous market (company R&D centres, private research centres, etc.) requires to strengthen links with external partners in research training (see Part 3, Section 1.3). Another reason for strengthening such a partnership is the necessity to diversify sources of funding for both research and research training (in particular to compensate for declining public support, see Part 1, Section). As already mentioned, external partners are increasingly involved in the research production at both national and international levels (see Part 1, Sections 2.5 and 2.6). As far as research training is concerned, such a partnership can be achieved at different levels: programme design, programme management ad assessment, teaching and student supervision (in courses and/or practical training in the field), programme funding, programme marketing, and/or certification.

Challenges

Developing partnership with external agents raises important challenges.
- Probably the most important challenge is to find appropriate forms of partnership in each situation that reconcile a genuine participation of the external partner in the development of the training programme and sufficient independence of academic partner in the conduct of the programme. There are no general rules in this matter and those forms must be negotiated and designed for each particular situation.
- Another potential problem concerns the difficulty to reconciliate the need for a sufficient stability of the programme over time and sometimes the versatility of the external partnership. Hat happens for instance if, for some internal reasons, the company partner decides to withdraw or dramatically decrease its contribution to funding of the programme? Or to discontinue the partnership at all after, say, one or two years? Probably, some contractualisation of the partnership is necessary to avoid or at least attenuate this kind of problems
- In any case, it is extremely important – and not always easy – to identify those areas where such partnerships is needed and the appropriate partners to be approached in the selected area.

PART 4

TOWARDS SCENARIOS FOR THE FUTURE OF THE HE/R SYSTEM

1. THREE POSSIBLE ATTITUDES TOWARDS THE TRENDS AFFECTING THE HE/R SYSTEM

On the basis of our analysis of the major trends and challenges that have been identified and discussed above, we have distinguished three major possible scenarios for the future of HE/R relationships. These scenarios result from the discussion of the expert group and refer more specifically to E. Fontela's contribution. We refer to this contribution for a deeper discussion of those scenarios and their consequences. They will be merely sketched in this part of the report. Before presenting those scenarios, it is important to emphasise three basic attitudes that can be taken by policy-makers with regard to the observed trends and challenges, and we suggest that the choice between these attitudes should at least partly affect the probability of occurrence of the scenarios presented below. In other words, we suggest that the occurrence of one scenario over the other is not merely a matter of external contingencies. It is also, and primarily, *a matter of political choice*.

- The first attitude ("Laissez-faire") consists of ignoring the observed trends or, at least to do nothing substantial about them, to let it go, for the best … or the worst. This is a "no prospective" attitude.
- The second attitude ("Active adjustment") consists of acknowledging the observed trends, taking them for granted, anticipating the near future, and actively adjusting the system for the best possible fit to them. This is the "exploratory prospective" attitude.
- The third attitude ("Proactive" or "teleological") consists first of all to make political choices and set priorities as to the values, goals and ends to be aimed at by the HE/R system in the future. These choices may lead decision-maker to adjust and support some of the trends but also to actively resist and fight against some others. In this attitude, it is very important to accurately identify anticipate the trends in order to be able to design effective strategies to achieve the ends that have been set up for the HE/R system.

2. THREE POSSIBLE SCENARIOS FOR THE FUTURE OF THE HE/R SYSTEM

2.1. THE "MELTING-POT" SCENARIO

The first scenario - The "Melting Pot" – implies a European context that is characterised by relatively low economic diversity combined with a relatively high level of social cohesion. This fits the current context quite well, with its trend towards increasing supranational integration and its concern for equity in the distribution of wealth across social groups and regions/countries. In such a scenario, the HE/R system appears quite similar to what it is now, that is, a "hybrid" system that produces both public goods (e.g., undergraduate education and basic research) and private goods (e.g., continuing professional education, applied R&D and innovation in response to the demands of companies and administrations).

The problem with this scenario is that it is very difficult to manage in the long run to the extent that the production of public and private goods implies basically very different production

systems that cannot easily coexist. The former is basically "supply-driven" (supply of infrastructures, teaching, disciplines, etc.), that is, driven by the HE/R system's own structure; whereas the latter is "demand-driven", that is, driven by the system's external environment (the various clients and stakeholders who have specific demands in terms of educational and training provision, research, development and innovation and a variety of services). In particular, privatisation of the latter system seems to be unavoidable in order to ensure efficiency and effectiveness in the long run, especially in a context of budget austerity.

This scenario is most likely to occur if policy-makers take the "Laissez-faire" attitude towards the trends identified in Part 1 and if the current diversity/cohesion pattern does not change significantly.

2.2. THE "MARKET TRIUMPH" SCENARIO

This scenario is likely to become a reality if the rise of neo-liberal economy and the crisis of the Welfare State accelerate and eventually reduce social cohesion, whereas diversity diminishes. In this scenario, the impact of the market forces and the resulting trend toward privatisation and marketisation of the whole HE/R will predominate completely. The whole system will be driven by the short-term external demands for human capital (employment) and technological capital (innovation) of companies and public administrations. The traditional hybrid system can no longer survive in such a context as long as it functions partly as a producer of public goods. In this context, the system as a whole must function as a system of private good production to be effective and efficient and gradual privatisation of the system therefore become inescapable. Public agents (public universities and research centres) as well as typically public goods produced by the system (such as basic higher education for all and basic research) are gradually losing importance.

This scenario is most likely to happen if policy-makers choose the "Active adaptation" attitude toward most of the trends identified in Part 1.

2.3. THE "CREATIVE SOCIETY" SCENARIO

This scenario does not "naturally" follow the current major trends. It requires a "proactive" attitude, which implies that the whole behaviour of the HE/R system – whether in terms of educational provision or research production – is clearly driven from inside, by the system itself. In the first two scenarios, the system was more or less reactive to the demands from its environment. On the contrary, in the third scenario, the HE/R becomes one of the key agents that influence society, it becomes a pillar of the growth of the knowledge society. Whereas the first two scenarios are accommodating the current trends towards more focus on the production of private education and research goods by private agents in the HE/R system, the third scenario overturns this trend, in terms of both research and educational provision.

- *Educational provision.* In the Creative Society scenario, on the one hand, public agents of the HE/R (i.e., public universities) will concentrate on the production of public "educational goods". In other words, it will concentrate on the provision of basic higher education for all. It is "basic" in the sense that the educational provision will focus on basic competencies and knowledge that are necessary for life in the knowledge society in a lifelong, "sustainable development" perspective, beyond the short-term demands of the markets. This is close to the idea of "sustainable" employability developed in Part 1. It is "for all" in the sense that access to this provision should be secured for all social groups. Every citizen will have the right to get access to that provision.

The "basic" higher education provision consists of both "initial" education (undergraduate and (post)graduate education) and continuing education. However, the "general" continuing education provided by the public agent is to be understood as a public good (lifelong learning) and should not be confused with specialised continuing education in response to the specific short-term demands from the market.

On the other hand, in this scenario companies and other private agents should clearly be given the responsibility of providing "private" educational goods, in particular, specialised continuing education to fulfil the specific demands of the labour market. Society, and therefore the public HE/R system, should not be responsible and accountable to provide this kind of service that directly contributes to companies' profit. To give companies the responsibility for providing the specialised educational service they need for their growth means that either they provide those services by themselves or they pay other agents (which could include public agents of the HE/R system) for providing those services but then, at the actual price and conditions of the market.

- *Research Provision*. The same logic should also prevail with regard to the research production of the HE/R system. On the one hand, public agents of the HE/R system should reinforce and concentrate on the "public" components of the current research production, that is, (1) to stimulate the basic scientific research production in a holistic and interdisciplinary perspective, (2) to facilitate the development of generic technologies, and (3) to sustain innovation in public utilities. In the first two scenarios, the dominant trend to shift from those aspects of the research production to technological innovation directly in response to the demands of the private market. On the other hand, the final responsibility for the production of R&D and technological innovation services and goods directly needed by companies should be given to companies themselves. In other words, in the "Creative Society" scenario, it is assumed that universities and public research centres are in the best position to respond to collective scientific and technological needs, whereas research centres from the private sector are in the best position to respond to the technological innovation needs of companies.

The third scenario may seem to be quite idealistic and could certainly not be implemented in the short run. However, it could be seen as a priority in the present political agenda of the EU to decide whether this scenario is to be chosen as goal to be aimed at in the long run. If it is the case, it is also a priority in the present political agenda for the EU to think about the strategies to be implemented to reach this goal, starting with the current reality of the HE/R system and its context.

RECOMMENDATIONS

1. To consolidate the results of previous studies and to develop studies and research on Higher Education/research relations in the 6th FP (priority 7 seems to be open to this opportunity). Further research on Foresight in this area is essential to build more relevant and efficient higher education systems in the ERA perspective.

2. Support to the implementation of a co-ordination group between services or Directorate dealing with the HE issues, to ensure coherence and efficiency in the decisions taken by the Commission on Higher education/Research relations.

3. Stimulate and reinforce interdisciplinarity in curricula and research, to link more outputs of science and technology and European socio-economic development. A more systematic insertion of history, philosophy and ethics modules in hard sciences as well as social sciences can fill the understanding gap between researchers and society/citizens.

4. More emphasis should be given in priority 7 to research on curriculum development, teaching methods and faculty development for the new context of Higher Education (characterised by a more diversified student population, in particular with the increase of mature students, , more emphasis on employability and interdisciplinarity in curricula, , and more competition across institutions). One of the work-programme activities should be clearly dedicated to this point.

5. More emphasis given to specific research on the training of researchers. Pilot experimentation should be financed and followed up to retain best practices all over Europe.

6. Wider access to HE but also to Research activity.

7. The group has clearly stated that future research activities (both applied and basic) should remain strongly linked to higher education. Best teachers must be excellent researchers and the other way around. It also means more integration between graduate education, undergraduate education and research within institutions.

8. that public support to higher education is fundamental to maintain high quality, independence and open access. A quantitative indicator (target) for public financing of higher education/research should be agreed as one of the future objectives of European Union. A clearer distinction should be made between those missions and activities that must remain funded by public support and those that could be funded by the private sector. In the latter case, partnership with private sector should be strengthened.

9. Countries' differences in the treatment of higher education/research should be considered as strength, allowing comparisons and learning the one from the other. This means that a common platform for the exchange of experiences and knowledge should be set up using the open co-ordination mode suggested in the Lisbon process.

10. An important effort should be made to motivate students towards hard sciences. Information, valorisation of results, cross disciplines research should put the emphasis on the importance of these sciences which constitutes the greatest potential for social and economical development.

11. A European status for the researcher should be established allowing mobility and greater homogeneity for careers. More work experience in the training of researcher. More involvement of research trainee in research team.

12. Finally never forget that when we start the training of a researcher, we ought to have an image of what will be the work that (s)he will have to do 10 to 20 years later. This shows the challenge for a better integration of foresight in this area of public choices and policies.

GROUP MANDATE

Objectives

In the context of the implementation of the Lisbon-Gotteborg strategy and possible synergies between the European research and education policies, the central topic of the Group of experts is foresight reflection on both movement of:

- ***renewal of the structures and programmes of higher education*** (mainly universities and engineers' schools) ***in response to or under the purpose of the dynamics of the research activity*** ;
- ***contribution of research*** as a training activity ***in the continued enrichment of the knowledge acquired*** by students.

These topics cover the following questions:

- What are the new fields of knowledge which emerge at the border of scientific and technological research (including the HSS) as well as in practice of the economic and social actors (various forms of expertise)? How do these new fields codify themselves and do they professionalise themselves?

- How this continuous emergence is taken into account in the disciplinary and organisational structures (departments, units of teaching, etc.) as much as in the curricula (structure, topics, teaching equipment, evaluation methods of the acquired knowledge, etc.) in higher education?

- In this context, what is the role of the higher education institutions in the field of the training in new jobs "knowledge high intensive" which are determined by the needs of the economic world, of public policies or of civil society in the broad sense? How conversely training through research widens the knowledge acquired by the young academic/engineer? How similarly the production of new knowledge and expert opinions in professional practice are transformed into "lifelong learning" and codified (cf. For example "business or companies universities " and "knowledge management")?

- What can the European Union suggest to stimulate on the one hand exchange of good practices between the Member States (open co-ordination) and to experiment innovative approaches within the framework, in particular, of the European research and education-training programmes?

To treat these questions the group could adopt a transversal approach addressing specific questions such as : access to higher education, recognition of diplomas, management (administrative and teaching) of higher education institutions, definition of the scientific curricula, use of information and communication technologies, support to training needs of industry, impact of teaching on research and in reverse of research on teaching, interdisciplinarity….

The Group should

- study in greater detail and supplement these questions and analyse their interrelationships
- establish a synthesis of most relevant research work related and
- outline an innovative political approach for Member States and European Commission.

Tasks

Based on the aforementioned considerations, the expert group will have the task to **prepare a report on options**

- **for supporting a broad spectrum of Foresight for Higher Education related activities, which contribute to the implementation of ERA, the Lisbon strategy and the Bologna Declaration, complement and strengthen related national and regional activities**, and could be implemented in the course of the next Research Framework Programme and beyond.

More specifically, the group will, **making full use of their networks, specific knowledge, and earlier synthesising work to:**

- **review the knowledge from EU, national, regional, and international sources on Foresight for Higher Education aspects relevant to its task** (purpose/utility, methodologies, producers, users, bystanders, type of products/results and conditions of their diffusion, etc.)
- **consolidate and synthesise this knowledge focusing on its specific value for strengthening the Foresight dimension of the ERA**, in a structured dialogue with selected EU and external persons to analyse and explain best practice in foresight and interactive research strategies
- **provide strategic guidance to the Commission and Member States** by outlining options for Foresight and Higher Education supporting measures, new co-operation schemes, and their connection to existing network structures and on-going activities, and by discussing the impacts and benefits of the different options suggested with respect to the European goals of education policies, strengthening of European research in science and technology, economic competitiveness, and European identity

EXPERTS GROUP

Président : Maurice Godelier Fr

Rapporteur : Prof Etienne Bourgeois (UCL) Be

1. Prof Peter Alheit (Dpt of Education, U. of Goettingen) De

2. Prof Denis Bédard (Faculty of Education, U. Sherbrooke) Ca

3. Mihaly Benedict (Department of Physics, University of Szeged -) Hu

4. Prof Erik De Graaff (Center for Educational Technology and Innovation, U. of Delft, Netherlands) Nl

5. Jean-Marie Deketele (UCL) Be

6. M. Fave-Bonnet (Université Paris 10) Fr

7. Prof John Field (Dpt of Continuing Education, U. of Warwick) Uk

8. Emilio Fontela (Université de Catalogne) Es

9. Prof Mariane Frenay (Faculty of Psychology and Education, University of Louvain) Be

10. Prof G. Grammatikakis (Université d'Irakleion) Gr

11. Imre Hronszky (Université de Budapest) Hu

12. Joseph Kastersztein Fr

13. Prof Anette Kolmos (Centre for University Teaching and Learning, Aalborg U., Denmark) Dk

14. Prof Peter Knight (Dpt of Educational Research, U. of Lancaster) Uk

15. Marek Kwiek (Université de Poznan) Po

16. Philippe Laredo (Ecole des Mines) Fr

17. Dr Barbara Merrill (Dpt of Continuing Education, U. of Warwick, UK) Uk

18. Jean-Jacques Paul (Université de Bourgogne) Fr

19. Dr Nicole Rege-Colet (Rectorat, U. of Geneva) Ch

20. Prof Alenoush Saroyan (Center for University Teaching and Learning, Dpt of Educational and Counselling Psychology, McGill University, Canada) Ca

INVITED PERSONS

21. Antoine Lyon Caen Nanterre Paris X Fr

22. Manuel Teixeira Carrondo Université de Lisbonne Pt

23. Flemming Fink Aalborg University Dk

24. Jeroen Huisman CHEPS Nl

25. Inge Knudsen EUA European Universities Association EU

26. Bernard Laurin Université de Bourgogne Fr

27. Gérard Lemaine EHESS Fr

28. Alain Michel Ministère Education Nationale Paris Inspecteur Général Fr

29. Jean-Michel Saussois Ecole Supérieure de Commerce de Paris Fr

30. Pierre-Alain SCHIEB OCDE

31. Marijk Van Der Wende University of Twente Nl

32. Prof Josep Vilalta Unesco Chair of Higher Education Management, Technical University of Catalonia Es

33. Ole Vinther Engineering College Copenhagen Dk

34. Lesley Wilson EUA European Universities Association EU

MEMBERS OF THE COMMISSION

1. **Angelos Agalianos** RTD/K/4

2. **Marie-Christine Brichard** RTD/K/2

3. **Paraskevas Caracostas** RTD/K/2

4. **Elie Faroult** RTD/K/2

5. **Gilbert Fayl** RTD

6. **Jocelyne Gaudin** RTD/D/1

7. **Guy Haug** EAC

8. **Corinne Hermant** EAC

9. **Marianne Hildebrand** EAC

10. **Anders Hingel** EAC

11. **Mary Kavanagh** RTD/C/2

12. **Jean-François Marchipont** RTD/K

13. **Philippe Martin** RTD/K1

14. **Belmiro Martins** RTD/K/2

15. **Martin O'Casey** EAC

16. **Isi Saragossi** RTD/K1

17. **Bruno Schmitz** RTD/D/3

LIST OF CONTRIBUTIONS OF THE MEMBERS OF THE HLEG

Alheit Peter : European Universities as Lifelong Learning Institutions: Theses on a 'Postmodernised' Higher Education System

Bédard Denis : Teaching and Learning in Higher Education: Trends, Scenarios and Impacts

Benedict Mihály G. : Reflections on the Theme Higher Education Research Relations from a Central European Perspective

Bourgeois Etienne : Adult participation in higher education in the European union. Implications for teaching and research

De Graaff Erik : Educating independent learners in a digital learning environment - Past performance is no guarantee for future success

De Ketele Jean-Marie : La recherche et la formation des chercheurs dans l'enseignement supérieur. Éléments de réflexion pour penser l'université de demain

Fave-Bonnet Marie-Françoise : La formation à la recherche

Field John : Widening participation in higher education in the European Union - an overview

Fontela Emilio : Prospective économique de l'université européenne

Frenay Mariane : Developing critical thinking and independent learning in undergraduate education ?

Godelier Maurice : Education et citoyenneté

Grammatikakis Georges : From a static to a dynamic university

Hronszky Imre : Changing engineering research relations - How to educate engineering students to become „reflective practitioners"?

Kastersztein Joseph : Contribution de la psychologie sociale à l'approche multidisciplinaire de la formation et de la recherche

Knight Peter : Complex learning - why it matters, what it is and how it may be stimulated & supported in higher education

Kolmos Anette : Foresight for the Engineering Education from an Educational Research Perspective

Kwiek Marek : The social functions of the university in the context of the changing State/Market relations

Laredo Philippe : Universities and their research activities: on-going transformations and new challenges

Merrill Barbara : Accreditation of Prior Experiential Learning (APEL): a European Perspective

Paul Jean-Jacques : Higher education institutions in the knowledge-based economies. Some reflections from the training perspective

Rege Colet Nicole : Faculty Development Strategies

Saroyan Alenoush : Academic leadership : A solution to address challenges facing universities

Schieb Pierre-Alain : OECD International Futures Programme

Vilalta J.M. / Oroval E. / Subirats J. : Challenges and opportunities for university institutions in a context of change

BIBLIOGRAPHY BOOKS AND ARTICLES

Abbott John and Ryan Terence, Constructing Knowledge, Reconstructing Schooling, *Educational Leadership*, November 1999, 9 p.

Agalianos Angelos, Noss Richard & Whitty Geoff, Logo in Mainstream Schools : the struggle over the soul of an educational innovation, British Journal of Sociology of Education, Vol. 22, n°4, 2001.

Agrafiotis D., « Knowledge and interdisciplinarity as socio-cultural uncertainties », « Learning Capacities in Knowledge Production Systems » (18-19/05/01), 24 p.

Aguiar Joaquim, Sociedade e Estado : Novas Dinâmicas, Novas Missôes da Educaçao - Cenarios e Condiçoes de Configuraçao da Sociedade Educativa, année ?, p. 41-57.

Allard Julie, Harscher Guy, Puig de la Bellacasa Maria, (Dir) , L'université en question, Labor Bruxelles 2001, 422 p.

Allègre Claude, L'âge des savoirs - pour une renaissance de l'université, Gallimard, Paris, 1993, 247 p.

Altbach Philip G. and McGill Peterson Patti, IIE Research Report Number Twenty-nine, Higher Education in the 21st Century : Global challenge and National Response, April 1999, 92 p.

Anuja Adhar Utz, Policy Forum on Using Knowledge for Development (19-25/03/01), Rapporteur Report, 2001, 29 p.

Anumba C.J., Bouchlaghem N.M., Whyte J., Duke A., Perspectives on an integrated construction project model. International-Journal-of-Cooperative-Information-Systems, Vol. 9, n°3, 2000, 08B12 ANU, p. 283-313.

Archer Margaret S., Théroie sociale et analyse de la société, *Sociologie et sociétés*, vol. XXX, n°1, printemps 1998, 14 p.

Ardoino Jacques, La complexité, Le défi du XXIe siècle (Edgar Morin), p. 442-450.

Arnold E., Bell M., Bessant J., Brimble P., Enhancing policy and institutional support for industrial technology development in Thailand. Vol. 1 The overall policy framework and the development of the industrial innovation system. Brighton : Technopolis, 2000.06, Biii TH ARN

Arnold E., Bell M., Bessant J., Brimble P., Enhancing policy and institutional support for industrial technology development in Thailand. Vol. 2 NSTDA. Brighton : Technopolis, 2000.06, Biii TH ARN

Arundel A., Geuna A., Does proximity matter for knowledge transfer form public institutes and universities to firms ? (A revised version of a paper prepared for the 8th Schumpeter Conference held in Manchester, July 2000.). Brighton : SPRU, 2001. (SPRU Electronic Working Paper Series ; n° 73).07C ARU.

Attali Jacques, Pour un modèle d'enseignement supérieur, Stock, Paris, 1998, 147 p.

Bakia Marianne, Costs of ICT use in Higher Education : What Little We Know, TechKnowLogia, January/February 2000, p. 49-54.

Beillerot Jacky, L'éducation en débats : la fin des certitudes, L'Harmattan, Paris, 1998, 154 p.

Beret Pierre, Les Transformations de l'Espace de Qualification des Chercheurs des Entreprises, Service du Développement Technologique et Industriel, Février 2000, 2 p.

Bernard Paul, Fournier Marcel et Saint-Pierre Céline, Présentation, Au-delà de la crise, un second souffle pour la sociologie, *Sociologie et sociétés*, vol. XXX, n° 1, printemps 1998, 6 p.

Berthelot Jean-Michel, Les nouveaux défis épistémologiques de la sociologie, *Sociologie et sociétés*, vol. XXX, n° 1, printemps 1998, 16 p.

Berthelot Jean-Michel, Présentation, *Sociologie et sociétés*, vol. XXXI, n° 1, printemps 1999, p.3-10.

Bishop John H. and Wöbmann Ludger, Institutional Effects in a Simple Model of Educational Production, 1999, 32 p.

Borsi Balazs, Studying the Diffusion of Modern Technologies in Hungary, Periodica Polytechnica Ser. Soc. Man. Sci., vol. 9, n° 1, 2001, p. 61-68.

Bouvrier Pierre, Le disciplinaire et l'interdisciplinaire « ordinaire* », *Sociologie et sociétés*, vol.XXXII, n° 1, p.229-234.

Brown James Robert, Privatizing the University – the New Tragedy of the Commons, Essays on Science and Society, 1999, 6 p.

Brunner José Joaquin, Viewpoints/Controversies, Globalization, Education and The Technological Revolution, *Prospects*, vol. XXXI, n° 2, June 2001, p. 132-148.

Camilleri Juanito, Information Technology in Education, Business Plan, October 1994, 39 p.

Colin Jean Pierre, Rituels pour un massacre, GeorG, Paris, 2001, 206 p.

Colombo Umberto, A Viewpoint from the Policy Community, OECD Megascience Forum, 7 p.

Conceiçao Pedro and V. Heitor Manuel, University role, On the role of the university in the knowledge economy, *Science and Public Policy*, volume 26, number 1, February 1999, p. 37-51.

Conseil National du Développement des sciences humaines et sociales, Pour une politique des sciences de l'Homme et de la société, PUF, Paris 2001, 245 p.

Côté Jean-François, La société de communication à la lumière de la sociologie de la culture : idéologie et transmission de sens, *Sociologie et sociétés*, vol. XXX, n° 1, printemps 1998, 16 p.

Cunningham Richard, Interdisciplinarity and the organisation of knowledge in Europe, European Commission, Brussels, 1999, 238 p.

Currie Jan and Newson Janice, Universities and Globalization, Critical Perspectives, chapter 10, p. 213-233.

Dacunha-Castelle Didier, Peut-on encore sauver l'école ? , Flammarion, Paris, 2000, 225 p.

Dandurand Pierre et Ollivier Emile, Présentation, Centralité des savoirs et éducation : vers de nouvelles problématiques, *Sociologie et sociétés*, vol. XXIII, n° 1, printemps 1991, p. 3-23.

Daniel John (Sir), The Multi-Media Mega-University : the Hope for the 21st Century, North of England Education Conference, Sheffield, 2-4 January 1997, 7 p.

Daxner Michael, The Responsibility of the University in a Globalized World, 2001, ? p.

Déval Katalin, Kerékgyarto György, Papanek Gabor and Borsi Balazs, Role of the Technical University's R&D in Hungarian Innovation, Periodica Polytechnica Ser. Soc. Man SCI, Vol. 9, n°1, 2001, p. 5-16.

Dhanarajan G., Technologies, A window for transforming Higher Education, TechKnowLogia, January/February 2000, p. 11-13.

Dickinson Dee, Meeting the Needs of a Rapidly Changing World, The Growing Diversity of Students Is Affecting Educational Planning and Practice in All Settings, Positive Trends in Learning : Meeting the Needs of a Rapidly Changing World, 3 p.

Draxler Alexandra, From the Information Society to the Knowledge Society : Questions for International Co-operation, TechKnowLogia, September/October 2000, p. 60-63.

Duchastel Jules et Laberge Danielle, La recherche comme espace de médiation interdisciplinaire, *Sociologie et Sociétés*, vol. XXXI, n° 1, printemps 1999, p. 63-76.

Duchastel Jules et Laberge Danielle, La recherche comme espace de médiation interdisciplinaire, *Sociologie et Sociétés*, vol. XXXI, n° 1, printemps 1999, 28 p.

Duderstadt James J., The Future of Higher Education, New Roles for the 21st-Century University, Issues in Science and Technology online, Winter 1999, 12 p.

Dumas Brigitte, Les savoirs nomades, *Sociologie et sociétés*, vol. XXXI, n° 1, printemps 1999, p.51-62.

Edmonds Rob, eLearning for a Knowledge Economy, Business Intelligence Program, 2000, 16p.

Edmonds Rob, eLearning for a Knowledge Economy, Business Intelligence Program, 2000, 2 p.

Education, Employment, Labour and Social Affairs, Innovations in Science, Mathematics and Technology Education, SMTE, 1999, 2 p.

Education, Employment, Labour and Social Affairs, Changing the Subject, Innovations in Science, Mathematics and Technology Education, Editors Black Paul and Atkin J. Myron, 1999, 5 p.

Entwistle Noel, Learning and Studying : Contrasts and Influences, Creating the future, Perspectives on Educational Change, Compiled and Edited by Dee Dickinson, 9 p.

European Commission, Communication from the Commission, A Strategy for Mobility of Researchers (draft), 2001.

European Commission, Directorate-General for Education and Culture, Education, Higher Education : Socrates-Erasmus, Jean Monnet Project, Synergies Research-Education, 2001.

Featherstone Mike, Technologies of Post-Human Development and the Potential for Global Citizenship, *Economics, Technology and Cities*, p. 203-223.

Fitoussi Jean Paul, L'enseignement supérieur des sciences économiques en question, Fayard, Paris, 2001, 206 p.

Fontela Emilio, Some Recommendations for ES/R Foresight STRATA-ETAN Group Report, 2 p.

Fontela Emilio, Successful Technology : The Success of R&D, ISC, année ?, 2 p.

Franck Robert, La pluralité des disciplines, l'unité du savoir et les connaissances ordinaires, *Sociologie et sociétés*, vol. XXXI, n° 1, printemps 1999, p. 129-142.

Freitag Michel, Le naufrage de l'université, La Découverte, Paris, 1995, 298 p.

Friedberg E. & Musselin Ch., En quête d'universités. Etude comparée des universités en France et en RFA. Paris : L'Harmattan, Logiques sociales, 1989.

Friedberg E. & Musselin Ch. (sous la dir. de), Le gouvernement des universités. Perspectives comparatives. Paris : L'Harmattan, Logiques Politiques, 1992.

Gardin Jean-Claude, Archéologie, formalisation et sciences sociales, *Sociologie et sociétés*, vol. XXXI, n° 1, printemps 1999, p. 119-127.

Garreton Manuel Antonio, Nouvelle problématique socio-historique et perspective sociologique, *Sociologie et sociétés*, vol. XXX, n° 1, printemps 1998, 11 p.

Gayathri Vasudevan, Re-thinking High Skilled International Migration : Some research and Policy Issues for India's Information Economy – International Mobility of Highly Skilled Workers from Statistical Analysis to the Formulaton of policies, COM/DSTI/DEELSA/RD (2001)11, Seminar organised by OECD, Paris 11-12 June 2001, 17 p.

German Industry Association, Summary, 3 % Communication, 3 p.

Gibbons Michael, Limoges Camille, Nowotny Helga, Schwartzman Simon, Scott Peter, Trow Martin, The new production of knowledge, The dynamics of science and research in contemporary societies, 1994, 179 p.

Godin Benoît et Trépanier Michel, Présentation, La science : nouvel environnement, nouvelles pratiques ?, *Sociologie et Sociétés*, vol. XXXII, n° 1,

Graduate Education Reform in Europe, Asia, and the Americas and International Mobility of Scientists and Engineers : Proceedings of a NSF Workshop, 2002, 38 p.

Grollmann Phillip and Sellin Burkart, L'état de la recherche européenne en formation professionnelle, ses fonctions et ses problèmes, Formation Professionnelle n° 17, Revue européenne, 1999, p. 74-81.

Guellec Dominique, Connaissance, Qualifications et Croissance : Contribution au débat économique, année ?, 44 p.

Hackmann Heide and Rip Arie, Priorities and quality incentives for university research, A brief international survey- countries studied : Australia, Belgium, Germany, Switzerland, UK, A report for the Netherlands Ministry of Education, Culture and Sciences, November 1999, 73 p.

Haddad Wadi D., Higher Education : The Ivory Tower and the Satellite Dish, January/February 2000, p. 5-6.

Haddad Wadi D., Is the Divide Digital, Editorial TechKnowLogia, March/April 2000, p. 5-6.

Hagan John et McCarthy Bill, La théorie du capital social et le renouveau du paradigme des tensions et des opportunités en criminologie sociologique, *Sociologie et sociétés*, vol. XXX, n° 1, printemps 1998, 14 p.

Halary Charles, Les exilés du savoir, L'Harmattan, Paris, 1994, 301 p.

Haselgrove Susanne, Future scenarios, From continuing education to lifelong learning : a review of UACE strategy and objectives, occasional paper n° 20, Papers arising from a UACE (Universities Association for Continuing Education) seminar held at Aston University,
9 September 1996, Edited by Richard Taylor and David Watson, December 1996, 6 p.

Higher Education Institutions' Responses to Europeanisation, Internationalisation and Globalisation (HEIGLO), Improving Human Potential and the Socio-Economic Knowledge Base (1998-2002), 3rd Call for Proposals, Project Proposal, Part B, Developing International Activities in a Multi-level Policy Context, December 2001, 28 p.

Higher Education in Science and Engineering, Chapter 2, Science & Engineering Indicators, 2002, 50 p.

Higher Education Institutions' Responses to European Integration and Globalisation. Developing International Activities in a Multi-Level Policy Context (HEIGLO), proposal
no. SERD-2002-00074, 3rd Call Improving the Human Research Potential and the Socio-economic Knowledge Base, Technical annex to the contract, 14 p.

Higher Education Reform Network (HERN) : A collaborative partnership to explore, disseminate and advise on the university of tomorrow - in relation to societal change and lifelong learning needs and in the context of European enlargement, (task 3 & task 5), 2001, 5 p + annex 1, 13 p.

Higher Education Reform Network : a collaborative partnership to explore, disseminate and advise on the university of tomorrow - in relation to societal change and lifelong learning needs and in the context of European enlargement, general project information - HPSE-2001-50011, 2001, 8 p.

High-Level Expert Group on Improving Mobility of Researchers, Final Report, 2001.

High-Level Forum on Knowledge Management : « Learning-by-comparing » experiences from private firms and public organisations (08 + 09/02/01), 7 p.

Hingel Anders J., Education Policies and European Governance, Contribution to the Interservice Groups on European Governance, DG EAC/A/1, Development of Educational Policies, March 2001, 22 p.

Human Development Report Office, UNDP, First Global Forum on Human Development, 29-31/07/1999, 7 p.

International Association of University Presidents (IAUP), International Seminar on « The new global role of universities » (Aalborg, Denmark, 22-23/03/02), 2002, 3 p.

International Association of University Presidents (IAUP), Lux Mundi, January 2002, 15 p.

International Institute for Educational Planning (IIEP), Increasing the managerial effectiveness of higher education institutions (An international research and training programme), 2002, 4 p.

Jaeger Carlo C., Perspectives from the Social Sciences, OECD Megascience Forum, 5 p.

Jelinek Mariann (Sam), 3. Innovation : From the Creation of Knowledge to National Well-Being (draft), p. 11-20.

Jurich Sonia, THE END OF THE CAMPUS UNIVERSITY ?, What the Literature Says about Distance Learning, TechKnowLogia, January/February 2000, p. 38-41.

Kerner W. (Dr.), Proceedings of 6th Workshop of Marie Curie Fellows : Research Training in Progress (Copenhagen, 04-06/09/00), 2000.

Kirkpatrick Heather and Cuban Larry, Working From What We Know : What Can (and Cannot) Be Learned From the Research on Computer Effectiveness in Classrooms », 15 p.

Klaff Daniel B. and Ehrenberg Ronald G., Collective Bargaining and Staff Salaries in American Colleges and Universities, Working Paper 8861, National Bureau of Economic Research, April 2002, 23 p.

Knorr Cetina Karin, Les épistèmes de la société : l'enclavement du savoir dans les structures sociales, *Sociologie et sociétés*, vol. XXX, n° 1, printemps 1998, 16 p.

Knowles Malcolm, Lifelong learning : A dream, Creating the future, Perspectives on Educational Change, 1998, 8 p.

Kruger Justin and Dunning David, Unskilled and Unaware of It : How Difficulties in Recognizing One's Own Incompetence Lead to Inflated Self-Assessments, Journal of Personality and Social Psychology, Vol. 77, n° 6, December 1999, p. 1121-1134.

Larédo Philippe et Penan Hervé, Gestion de l'emploi des chercheurs et innovation, 1 p.

Latour Bruno, Vous avez dit pluridisciplinaire ?, La Recherche, avril 2000, 1 p.

Laurillard Diana, The Virtual University : Value and Feasibility, 12 p.

Lazar Judith, Les secrets de famille de l'université, Le Seuil, Paris 2001 176 p.

Lindley Robert et al., Potential of Community Policies for Employment Promotion Research and Life-long Learning, 2002, 63 p.

Lopez-Acevedo Gladys, Mexico – Technology, Wages and Employment, Technology and Skill demand in Mexico, February 2002, 21 p.

Lopez Ramon, Thomas Vinod and Wang Yan, Addressing the Education Puzzle : The Distribution of Education and Economic Reform, December 1998, 2 p.

L'Université du Bien Commun, Imaginer, partager et agir. Pour un autre monde, année ?, 3-16 p.

Luyckx Marc, « Why culture becomes central in the Global Knowledge Society », 1° UNESCO Conference : « The power of culture : Entreprise, Human Development and Culture in the Global Age » (Stockholm, April 1-4 1998), 12 p.

Mahroum Sami, Skilled labour, Competing for the highly skilled : Europe in perspective, *Science and Public Policy*, volume 26, n° 1, February 1998, p. 17-25.

Main Committee, Higher Education in the 21st century : some possible futures, 5 March 1999, 10 p.

Maingain Alain, Dufour Barbara, Fourez Gérard, Approches didactiques de l'interdisciplinarité, De Boeck, Bruxelles, 2002, 282 p.

Martin Ben R., The changing social contract for science and the evolution of the university, Draft chapter prepared for book edited by A. Geuna, A. Salter and W. E. Steinmueller on Science and Innovation : Rethinking the Rationales for Funding and Governance, 2001, 20 p.

Martin Ian and Shaw Mae, Sustaining social purpose in the current policy context, p. 305-310.

Masjuan Josep, Troiano Helena, University, Employability and Employment, Paper presented at the Higher Education Close Up Conference 2, Lancaster University, 16-18 July 2001, 18 p.

Mercer David, Life-Long-Learning is the Future, *Foresight*, 1999, 10 p.

Merisotis Jamie P. and Olsen Jody K., The 'effectiveness' debate : what we know about the quality of distance learning in the U.S., January/February 2000, p. 42-44.

Metcalf Hilary, Increasing Inequality in Higher Education : the Role of Term-Time working, October 2001, 14 p.

Ministère de la Recherche (Fr.), Le plan décennal (2001-2010) de gestion prévisionnelle et pluriannuelle de l'emploi scientifique, 2001, 23 p.

Moez Doraid, Analytical Tools for Human Development, Human Development Report Office, August 1997, 8 p.

Morin Edgar, La tête bien faite, Seuil, Paris, 1999, 154 p.

Morin Edgar, Science et Conscience de la Complexité, 1er et 2ième chapitre, p. 21-77.

Müldür Ugür, Les Universités : Acteurs – Clé de la transition vers la Société et l'Economie fondée sur la Connaissance, Commission Européenne, 2001, 13 p.

Murphy Roger and Wilmut John, Key Skills – A new challenge for universities ? – BERA Conference Paper to be presented in the 'International Perspectives on Key Skills and Portfolios' Symposium on Friday 11 September 1997, 3 p.

Musselin Christine, La longue marche des universités, PUF, Paris, 2001, 218 p.

Mustar Philippe (Prof.), Public support for the spin-off companies from Higher Education and Research Institutions, Draft paper prepared for the STRATA Consolidating Workshop (22-23/04/02), 2002, 15 p.

Myles John, Les limites des prophéties, ou les raisons d'être de la modestie intellectuelle en sciences sociales, *Sociologie et sociétés*, vol. XXX, n° 1, printemps 1998, 13 p.

National Science Foundation, Directorate for Education and Human Resources NSF 98-73, Shaping the Future : Strategies for Revitalizing Undergraduate Education, Proceedings from the National Working Conference of 11-13 July 1996 (Washington), 75 p.

Newby Howard (Prof.), Main Committee, Higher Education in the 21st century : some possible futures, March 1999, 10 p.

OECD Berlin Conference : Experts Presentations (6 workshops), 2002, 4 p.

OECD/OCDE, l'Innovation dans l'Enseignement, bulletin d'information 1997/1, 4 p.

OECD/OCDE, l'Innovation dans l'Enseignement, bulletin d'information 1997/2, 4 p.

OECD/OCDE, l'Innovation dans l'Enseignement, bulletin d'information 1997/3, 4 p.

OECD/OCDE, l'Innovation dans l'Enseignement, bulletin d'information 1998/1, 4 p.

OECD/OCDE, l'Innovation dans l'Enseignement, bulletin d'information 1998/2, 4 p.

OECD/OCDE, Highlight of the OECD Information Base, n° 19, December 1999, 12 p.

Olsen Jody K., Is Virtual Education For Real ?, Issues of Quality and Accreditation, TechKnowLogia, January/February 2000, p. 16-18.

Pavitt Keith, Academic Research in Europe, SPRU, Electronic Working Papers Series, Paper n° 43, First draft of a paper to be presented at Workshop II of the EU funded Europolis Project in Lisbon, 5-6 June 2000, 15 p.

Pavitt Keith, European funding, Why European Union funding of academic research should be increased : a radical proposal, *Science and Public Policy*, volume 27, number 6, December 2000, p. 455-460.

Pennec Simone, Former des adultes, l'université et les transformations de l'emploi, PUR, Rennes, 2002, 220 p.

Pesanelli David, The Plug-In School, A learning environment for the 21st Century, New Technologies make it possible for learning to take place anywhere. The Plug-In School may show the way, p. 157-160.

Positive Trends in Learning : Meeting the Needs of a Rapidly Changing World, Conclusion : Metatrends in Learning Are Emerging, 2 p.

Positive Trends in Learning : Meeting the Needs of a Rapidly Changing World, Universities Are Developing New Ways of Preparing Teachers, 2 p.

PriceWaterhouseCoopers, 3 Overview of changes in policy towards higher education and research institutes per country, p. 21-34.

PriceWaterhouseCoopers, 4 Overview of changes in policy towards interaction between industry and higher education and research institutes per country, p. 35-43.

R&D expenditure from the viewpoint of the higher education sector : The (r)evolution of the university system, 12 p.

Rege Colet Nicole, Enseignement universitaire et interdisciplinarité, De Boeck, Bruxelles, 2002, 214 p.

Renaut Alain, Que faire des universités ?, Bayard, Paris, 2002, 108 p.

Rentrop Timm (Dr.), The Mutual Recognition of Diplomas, A quest for a more effective/efficient operation of the system while 'living in the shadows', Eipascope 2002/1, p. 18-24.

Revue de synthèse, Pensée des sciences, 1999, 226 p.

Rodrigues Maria Joao (Prof.), Social Sciences and Europe - Building a Knowledge Society, 2002, 14 p.

Rogers W. Mike, Future Models for Interdisciplinary Research, May 2002, 4 p.

Rolfe Heather, University strategy in an age of uncertainty : the effect of higher education funding on old and new universities, Discussion Paper n° 191, December 2001, 21 p.

Roqueplo, Philippe, Le partage du savoir, Seuil, Paris, 1974, 254 p.

Rowland Stephen, Higher Education : Purposes and Roles, Paper presented at the British Educational Research Association Annual Conference, University of Leeds, 13-15 September 2001, 5 p.

Saint William, Implementation of Tertiary Distance Education, Choices and Decisions, TechKnowLogia, January/February 2000, p. 45-48.

Salmi Jamil, Higher Education, Facing the Challenges of the 21st Century, TechKnowLogia, January/February 2000, p. 7-10.

Savukinas Robert and Jackson Gregg, Open Universities : A Revolution in Lifelong Learning, TechKnowLogia, September/October 2000, p. 33-35.

Schimank Uwe and Winnes Markus, European university systems, Beyond Humboldt ? The relationship between teaching and research in European university systems, *Science and Public Policy*, volume 27, n° 6, December 2000, pages 397-408.

Sciences Humaines, La Société du savoir, L'impact des nouvelles technologies sur la vie quotidienne, l'économie, l'éducation, la formation, la démocratie…, mars-avril-mai 2001, 75 p.

Section II – Investment in Education and Training, 20 p.

Sjoberg Svein, Science and Technology in Education – Current Challenges and Possible Solutions, Invited contribution to Meeting of European Ministers of Education and Research, Uppsala 1-3 March 2001, 13 p.

Skule Adam Colleen, The international Scientific Programme approach : diversitas, OECD Megascience Forum, 2 p.

Sommestad Lena, Education and Research in Times of Population Ageing, Paper to be presented at the Informal Meeting of Ministers of Education and Research, Uppsala, 1-3 March 2000, 18 p.

SRHE International News, Globalisation and higher education : views from the South, Papers from the conference in Cape Town, South Africa, March 2001, 36 p.

Stevens Philip Andrew, The Determinants of Economic Efficiency in English and Welsh Universities, September 2001, 35 p.

Stiglitz Joseph, Scan Globally, Reinvent Locally : Knowledge Infrastructure and the Localization of Knowledge, Keynote Address First Global Development Network Conference, December 1999, Bonn, Germany, 20 p.

Sztompka Piotr, Devenir social, néo-modernisation et importance de la culture, Quelques implications de la révolution anticommuniste pour la théorie du changement social, *Sociologie et sociétés*, vol. XXX, n° 1, printemps 1998, 10 p.

The CVCP's evidence to the National Committee of Inquiry into Higher Education, 1 Vision statement and main recommendations, 7 p.

The CVCP's evidence to the National Committee of Inquiry into Higher Education, 2 Main evidence, 27 p.

The CVCP's evidence to the National Committee of Inquiry into Higher Education, 4 Special report : The case for a new higher education funding system, 18 p.

The Economist, Inside the Knowledge Factory, All must have degrees, The tower of science, The core and the cloud, 2 October 1997, 29 p.

Tjeldvoll Arild, Preparing Service University Research, Studies in Comparative and International Education n°5, 2000, 69 p.

UNESCO, Educating for a Sustainable Future : A Transdisciplinary Vision for Concerted Action, November 1997, 42 p.

UNESCO, Follow-up to the World Conference on Higher Education, Thematic Debate : « The requirements of the World of Work », 2001, 22 p.

UNESCO, Higher Education in the Twenty-First Century : Vision and Action, 52 p.

UNESCO Presse, l'Unesco invite les plus grands experts mondiaux à « plancher » sur les sociétés du savoir, avis aux médias n°2002-14, 2 p.

UNICE position paper on the future EU cooperation in the field of education and training Executive Summary, 2002, 10 p.

University of Oxford, Submission to the National Committee of Inquiry into Higher Education, 1996, 24 p.

University of Stirling, Submission to the National Committee of Inquiry into Higher Education, 1996, 5 p.

University of Strathclyde, Submission to the National Committee of Inquiry into Higher Education, 1996, 17 p.

Valade Bernard, Le « sujet » de l'interdisciplinarité, *Sociologie et sociétés*, vol. XXXI, n° 1, printemps 1999, p. 11-21.

Van den Bosch Herman (Dr.), Teelken Christine (Dr.), Organisation and leadership in higher education, Learning form experiences in the Netherlands, 17 p.

Veltman B.P.Th., Trading in knowledge. University patenting policy for the benefit of utilising knowledge, Adopted in The Hague, June 2001, 5 p.

von Hippel Eric and Tyre Marcie, « How « Learning by Doing » is Done : Problem Identification in Novel Process Equipment. », *Research Policy*, January 1995, 12 p.

Weil-Barais Annick, Constructivism and Education, Constructivist Approaches and the Teaching of Science, *Prospects*, Vol. XXXI, n° 2, June 2001, p. 188-196.

Weiler Raoul, About the Relationship between Science, Technology and Society, 32 p.

Whitehead Jack, How have I engaged with the power relations in the academy in supporting the self-studies of practitioner-researchers ?, A paper presented to the Symposium on : *How do we co-create and share our educational knowledge and theories through talking together in our self-studies of our educational research and practices ?,* American Educational Research Association Conference, March 24-28 1997, Chicago, 14 p.

Wildman Paul, From the Monophonic University to Polyphonic Multiversities, *Futures*, Vol. 30, n°7, 1998, p. 625-633.

Wilson Alan, The virtual university ? – An institutional perspective, May 1996, 7 p.

Wolff Laurence and MacKinnon Soledad, What is The Digital Divide ? TechKnowLogia, July-September 2002, p. 7-9.

Wood Dominic, Uncertainty in higher education : what happens when we apply the precautionary principle to academia ?, Paper presented at the British Educational Research Association Annual Conference, University of Leeds, 13-15 September 2001, 10 p.

Wood Graham, Higher Education Close-Up2 – An International Qualitative Research in Higher Education Conference – July 16-18, 2001 Lancaster University, the Role of Government in the Establishment, Accreditation and Quality Assurance of Universities : a Comparative International Study of the Netherlands, the UK, the USA, New Zealand and Australia, 2000, 15 p.

Working Group on Quality Indicators, European Commission, DG Education and Culture, European Report on Fifteen Quality Indicators of Lifelong learning, June 2002, 95 p.

WöBmann Ludger, New Evidence on the Missing Resource-Performance Link in Education, Kiel Working Paper n° 1051, June 2001, 40 p.

Yoni Ryan, The Business of Borderless Education And Lifelong Learning, TechKnowLogia, September/October 2000, p. 36-39.

Ylijoki Oili-Helena, Humboldt meets market forces - A narrative approach to academic work, Paper presented at the Higher Education Close Up Conference 2, Lancaster University, 16-18 July 2001, 22 p.

Zukas Miriam and Malcolm Janice, Models of the educator in higher education, Paper presented at the British Educational Research Association Conference, University of Sussex, at Brighton, 2-5 September 1999, 9 p.

BIBLIOGRAPHY REPORTS

Barlow J., Ozaki R., Japanese lessons on customer-focused housebuilding. Report of a Department of Trade and Industry Expert Mission, October 2001.
Brighton : SPRU, 2001. 08B12 BAR

Barlow J., Venables T., Housing and construction : identifying missing research needs and opportunities. Final version of a report prepared for the Construction… ?

Banque Mondiale Washington, Rapport sur le développement dans le monde, Le Savoir au service du développement, résumé, 1998-1999, 33 p.

Bourgeois Etienne (Prof.), EU Socio-economic research : University Adult Access Policies and Pr   actices across the European Union and their consequences for the participation of non-traditional adults, 2001, Final report of project ERB-SOE2-CT97-2021, 166 p.

Casey Tom, Mahroum Sami, Ducatel Ken & Barré Rémi, The mobility of Academic Researchers : Academic Careers & Recruitment in ICT and Biotechnology, European Commission, 2001, Report EUR 19905 EN, 62 p.

Conseil de l'Union européenne, Rapport du Conseil « Education » au Conseil européen sur « Les objectifs concrets futurs des systèmes d'éducation et de formation », 5980/01 EDUC 18, février 2001, 41 p.

EU Research Policy Working Group, Conference on The Impact on Academic Institutions of Research Evaluation Systems, Final Report, Confederation of European Union Rectors' Conferences, Lisbon, 23-24 June 2000, 35 p.

European Training Foundation, Cross-country analysis, Report, Continuing Vocational Training, Volume 1, October 1999, 65 p.

FORMAKIN (Foresight as a Tool for the Management of Knowledge Flows and Innovation), Final Report of the FORMAKIN Project, TSER Programme Stage II, Work Package 5/6, January 2001, 89 p.

FORMAKIN (Foresight as a Tool for the Management of Knowledge Flows and Innovation), Annexes to the Final Report of the FORMAKIN Project, TSER Programme Stage II, Annexes to Work Package 5/6, Country Case Studies, January 2001, 95 p.

Haug Guy, Kirstein Jette and Knudsen Inge, Trends in Learning Structures in Higher Education, Project Report, 7 June 1999, 69 p.

Haug Guy, Kirstein Jette et Knudsen Inge, Evolution des structures d'éducation dans l'enseignement supérieur en Europe, Rapport préparé pour la Conférence de Bologne du 18-19 juin 1999, août 1999, 74 p.

Haug Guy et Tauch Christian, Tendances des structures d'éducation dans l'enseignement supérieur (II), rapport de suivi préparé pour les Conférences de Salamanque et de Prague de mars/mai 2001, avril 2001, ? p.

High Level STRATA Expert on Foresight for Higher Education/research relations - final conference – contributions/issue papers - part 1 + part 2, 2002, ? p.

High Level STRATA Expert on Foresight for Higher Education/research relations - contributions/issue papers - part 1 + part 2, 2001-2002, ? p.

IES (the Institute for Employment Studies), Pearson R., Jagger N., Connor H., Perryman S. (IES) with Marey P., de Grip A. and Corvers F. (ROA), Report 377, Assessing the Supply and Demand for Scientists and Technologists in Europe, UK, 2001, 208 p.

Lourtie Pedro, Furthering the Bologna Process, Report to the Ministers of Education of the signatory countries, Prague May 2001, 41 p.

Martinelli Daniel, A Brain Drain among Young PhD graduates : Mirage or Reality ? International Mobility of Highly Skilled workers : From statistical Analysis to the Formulation of Policies, COM/DSTI/DEELSA/RD(2001)4, Seminar organised by the OECD, Paris, 11 and 12 June 2001, 7 p.

OECD/OCDE, Thematic review on Adult Learning, A Progress Report, October 2000, 12 p.

OECD/OCDE, Knowledge management : Learning-by-comparing experiences from private firms and public organisations, CERI/CD(2001)2, Summary Record of the High Level Forum held in Copenhagen, 8-9 February 2001, 28 p.

OECD/OCDE, le Secrétariat, Human Resources in Science and Technology : Measurement Issues with Special Regard to International Mobility, International Mobility of Highly Skilled Workers : From Statistical Analysis to the Formulation of Policies, COM/DSTI/DEELSA(2001)31, Seminar organised by OECD, Paris, 11 and 12 June 2001, 26 p.

OECD/OCDE, le Secrétariat, la Mobilité Internationale des Ressources Humaines en Science et Technologie : Problèmes de mesure – La mobilité internationale des travailleurs hautement qualifiés : de l'Analyse Statistique à l'Elaboration des Politiques, COM/DSTI/DEELSA(2001)31, Séminaire organisé par l'OCDE, Paris 11-12 juin 2001, 28 p.

Séré Marie-Geneviève (Prof. Dr.), Improving Science Education : issues and research on innovative empirical and computer-based approaches to labwork in Europe, European Commission, 1996-1998, Final report of project ERB-SOE2-CT95-2001, ? p.

Sexton J. J., The Feasibility of providing statistical information on the International Mobility of Human Resources in Science and Technology, International Mobility of Highly Skilled Workers : From statistical Analysis to the Formulation of Policies, COM/DSTI/DEELSA(2001)30, Seminar organised by OECD, Paris, 11 and 12 June 2001, 27 p.

Strata-Etan expert working group, Benchmarking National R&D policies, Human Resources in RTD (including attractiveness of S&T professions), intermediate report, Version 1, October 2001, 62 p.

Strata-Etan Group Final Report Draft, Higher Education and Research for the ERA. Current Trends and Scenarios for the Future, 25 April 2002, 18 p.

The Netherlands Ministry of Education, Culture and Sciences, Priorities and quality incentives for university research, November 1999, 73 p.