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Observatory for Fundamental University
Values and Rights

Managing University Autonomy

University autonomy and the institutional balancing of teaching and research

Proceedings of the Seminar
of the Magna Charta Observatory
15 September 2005

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MAGNA CHARTA UNIVERSITATUM

Bononia University Press

Bononia University Press
Via Zamboni 25 – 40126 Bologna

ISBN 88-7395-104-X

www.buponline.com
e-mail: info@buponline.com

Printed in Italy

Printed by: Arti Grafiche Editoriali s.r.l. – Urbino

First printed in December 2005

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Foreword

Prof. Fabio Roversi-Monaco
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The intention of the Observatory is to make the annual meeting not just a formal occasion and a celebration – this year another 26 universities were welcomed as signatories of the Magna Charta -, but above all an opportunity to define the mission and tasks of the Observatory in a way that closely reflects the reality of university life today, that is in the light of the rapid development and changes that characterise national systems of higher education all over the world.

This reality of continuous transformation is characterised usually by large numbers of students, by a lack of resources almost in every country, and in many cases by society's indifference or lack of knowledge about the constraints and work of academics.

Those who conceived and launched the Magna Charta took as their starting point the medieval tradition and the classical university as it developed in Europe, but in an awareness of the need to take account of the profound changes affecting the very concept of the University, also in other parts of the

world since the Magna Charta of European Universities immediately attracted support from numerous and prestigious institutions in the United States, Latin America, Australia and Asia.

In 1988, when the charter was signed, the aim was to reconsider the origins of the University and the definition of its characteristics, taking as its founding principle the freedom of the individual – both academics and students – and the autonomy and independence of the institution *vis-à-vis* every form of power. But in the Magna Charta there are also many references revealing an awareness of the entire society in which the University is rooted, and of the obligation to take account of its progressive and rapid evolution. Thus, today, there is an evident need to consider other aspects of University autonomy, not simply in an institutional dimension, but concerning relations with society, in the sense that the society that the University is called on to serve autonomously, and the institutions of the State, that are an expression of society, demand high-level services: this implies reciprocal limitations and the definition of shared objectives, also because the State is called on to provide most of the funding required for higher education in almost every country.

In other words, university autonomy *vis-à-vis* every form of power – whether it be political, economic or religious – is a fundamental principle of the Magna Charta that cannot but take into account the State's and other public bodies' interventions now essential, in most countries, for the life of the University. However, this position has an insuperable limit. We cannot go beyond the point at which these interventions would result in conditioning or domination. In recent years the Observatory has played an exclusive role *of its own,* particularly significant in this connection, to provide adequate protection for all the Universities in dif-

ferent situations that have asked for it. At the same time the choice of the Observatory has been to provide the widest possible representation of the complex and differentiated world of higher education.

The number of Universities applying to sign the Magna Charta has multiplied, and they are often located in countries where in the past they were denied the opportunity to make this choice. Many of them are ancient and authoritative Universities, while others are newly founded institutions, that have decided to join the Community of signatory Universities, supporting the principles of our document and thus themselves making a commitment, we should remember, to respect its essential provisions.

In taking into consideration these new applications, the Observatory has often had to face the problem of updating and providing a more detailed interpretation of the concepts laid down by the Magna Charta. We have done so, and continue to do so, with the intention of being representative of a system that is now global, and that cannot be crystallised in some period in the past, but that must be carefully interpreted, reflecting rapid innovation and emerging needs. Fundamentally this is our role.

Therefore, the topic of our 2005 conference '*University autonomy and the institutional balancing of teaching and research*' is truly a central issue for today's academic world as it goes to the heart of the identity of our institutions, probing their capacity to define coherent, relevant and objective policies that shape the universities in society.

As in 1988, our aim is in all cases to link research and teaching, still taking this link to be the principal distinctive and indissoluble element of the notion of University. However, we cannot fail to take account of the present-day situation, in which on the one hand

there are major public and private research centres and industrial laboratories located outside the University system and extraneous to it, while on the other hand we have what is known as higher education for the masses, with a demand for innovation and rapid technological transfer coming from society and the economy, together with market competition, and an increasing demand for higher education. Social accountability also means that we have to deal more and more with the external evaluation of the use of public funding spent for research purposes.

Research and Teaching, the Magna Charta says, are closely linked. But does this imply that *all* Universities must be *leading centres* for scientific research? Universities have been characterised by their autonomy, which also means self-government, but is it possible for this self-government to continue to be what it is in many countries, including Italy: that is to say, characterised by lack of close relations and organisational links with society?

These are some of the important issues addressed by the 2005 conference of the Magna Charta, as introduced by a panel of distinguished Speakers, to whom I wish to extend my gratitude and appreciation, *Michael Gibbons*, former Secretary General of the Association of Commonwealth Universities, and *Paolo Blasi,* former Rector of the University of Florence and member of the Board that advised the European Commissioner on matters of research. As keynote speakers, they offered the meeting provocative views taken from their long experience of the research debate in Europe. Later on, *Peter Magrath*, President of the National Association of State Universities and Land Grand Colleges, offered a comparative views from the US. They all reacted to a study that the Observatory commissioned to *Ulrike Felt*, from the University of Vienna, on the

links between research and teaching in what she calls the post-Humboldtian context of today's emerging knowledge society; this paper had been distributed in advance to all the participants so that the debates could be rich, pointed and diverse. This wealth of material makes the core of the present publication: to it were added some of the reactions that had been asked from the floor.

From the discussions emerged the need for a new, multi-layered 'contract' between the University and Society, updated in keeping with the needs of the contemporary world and capable of being further updated with the same rapidity that characterises the transformation of society. In this context, institutional autonomy remains a requirement for flexibility and ability to adapt, while making possible an expression of society's long-term well-being as it is searched, tested and imagined in those centres that are both exploring *and* disseminating knowledge, the universities.

Revisiting the Research–Teaching Nexus in a Post-Humboldtian Environment[1]

Prof. Ulrike Felt in collaboration with Michaela Glanz,
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Introductory remarks

In early April 2005 the EU Commissioner for Education, Training, Culture and Multilingualism, Ján Figel, announced that the Commission was to publish a communication on universities and the Lisbon strategy.[2] He underlined that the strategic issues of attractiveness, governance and funding would be addressed. The aim was a new kind of partnership between states and universities that could combine both institutional and systemic reforms in key areas; thus, universities should have more autonomy and scope for self-governance; full accountability to society; a creative mix of public and private funding; they should use fiscal incentives and fees; and ensure fair access to all qualified students. Europe's universities should become more

[1] We would like to express our thanks to Maximimilian Fochler who gave us support and advice in producing the final version of this report.

diverse in terms of target groups, exit and entry points, learning methods and also in terms of the type and relevance of their research.[3]

Indeed, after a period of shadowy existence, it seems that universities have made again their way up to the top of the policy agenda. At the core of this renewed social interest is the research-teaching nexus. Thus, following two explorative studies on university autonomy in relation to decision-making structures and human resources management, on the one hand, or to the universities' research activities[4] on the other, the present essay focuses on **structuring the university autonomy at the interface of research and teaching**. This topic was determined by the fact that university identity is still deeply grounded in articulations that variously link these two core activities at a time when their nexus is currently undergoing profound transformations, their institutional balancing becoming again a key point in the formulation of what makes university autonomy. There is no intention, however, to revisit the classical debate around Humboldtian ideals and the university's dependence on them. This has been done repeatedly over the past decades and would evoke a *déjà vu* feeling without taking us much further. Moreover, we would miss a number of the new facets and central challenges this nexus proposes in connection to

[2] See, EU Communication on *Mobilising the brainpower of Europe by enabling universities to make their full contribution to the Lisbon Strategy*, Brussels, April 2005

[3] See for example: http://www.euractiv.com/Article/tcmuri=tcm:29-137457-16&type=News, or http://www.eubusiness.com/topics/Living_in_EU/uni.2005-04-04/view

[4] See: Felt/Glanz (2004, 2003); this study is explorative and based on material collected as well as interviews made in the following countries: Austria, Finland, France, Germany, Greece, Hungary, Italy, The Netherlands, Spain, UK.

the universities' social repositioning as autonomous institutions. Indeed, Humboldt's ideals were born out of – and have to be understood in – a specific historical socio-cultural constellation. In the early 19th century, interactions between scientific knowledge production and economic development were just about to be organised, research had still to be established as a key activity within universities, and science was only starting to become a profession – prone to define and refine its rules for the production of knowledge or for the reproduction of the scientific field. Most of us would probably agree that the balance between research and teaching that followed was central to the success of this model – and of this ideal – in the university world. Yet, it is important not to ignore today's fundamental changes in the societal boundary conditions that affect universities and thus to understand the necessity for reconsidering those basic functions and mechanisms that seem so widely accepted.

Now, at the beginning of the 21st century, the research-teaching nexus – and the reforms it could need – fuel debates at the European as well as at national levels. A reflection on what is at stake thus seems essential. On the European level, two major developments have to be taken into consideration that will frame potential university reforms in the future. The first is the creation of the so-called *European Research Area* – with its links to the objectives formulated in the Lisbon Declaration[5] that point to a targeted increase of

[5] For the presidency conclusions of the Lisbon European Council (2000) see: http://ue.eu.int/ueDocs/cms_Data/docs/pressData/en/ec/00100-r1.en0.htm
For the Lisbon strategy in the area of education and training as a follow-up to the Lisbon Declaration see: http://europa.eu.int/comm/education/policies/2010/et_2010_en.html

research expenditure up to 3% of GDP by 2010. This is the common European goal fixed at the Barcelona European Council[6] in order to make of Europe the most competitive knowledge economy in the world. Such a rise in funding (which is to be carried by the industrial sector mainly) will entail a formidable *growth in the number of knowledge workers*. Indeed, the knowledge industry can no longer be built on a small intellectual elite: it requires massive intellectual human resources, a golden opportunity for the universities to strengthen their role in society since they should ensure the training of a large part of this personnel.[7]

The second major force framing university developments in the European context is the so-called 'Bologna process'[8], which is gradually encompassing many various national situations. It aims at a convergence of study structures and degrees, adapting them to societal needs while creating the boundary conditions required for an increased mobility of students and teachers across Europe; the process is also supposed to leave the universities sufficient space – or autonomy – to propose specific activities. The aim is to create a *European Higher Education Area* alongside with the *European Research Area*. This goal does not go without an ample and critical debate on what the process implies in terms

[6] For the presidency conclusions of the Barcelona European Council (2002) see: http://ue.eu.int/cms3_applications/Applications/newsRoom/LoadDocument.asp?directory=en/ec/&filename=71025.pdf

[7] see: High Level Group on Human Resources for Science and Technology (2004), European Commission (2002b)

[8] For an overview on the Bologna process and its national implementation see for example: Eurydice (2003), Reichert/Tauch (2003). The main official documents concerned with the Bologna process can be found at the current Bologna web-site „From Berlin to Bergen": http://www.bologna-bergen2005.no

of basic values and mid-term potential.[9] Perceptions, indeed, differ between countries, between institutions in their national setting, as well as between disciplines. The Bologna process mirrors the diversity of the European universities and the tensions that arise from their differences. A detailed analysis of the on-going debate concerning shared structures in academic teaching would however go beyond the scope of this paper.

The importance of the research-teaching nexus was also underlined when the European Commission did set up high-level expert groups to deal with the role of universities as well as with human resource development in Europe, the two areas being identified as strategic issues for the future development of a competitive knowledge economy.[10]

Beyond these explicitly trans-national policy developments, universities find themselves confronted with a number of factors – national and local, external or internal – that trigger change in their teaching and research activities. Such factors – *external* to the university – are the relative decrease of public expenditure for higher education institutions; a growing emphasis on economic rationality in the understanding and contextualisation of public institutions and services, universities included; the increase of stakeholder intervention in issues perceived until recently as internal to the institutions of higher education and research; and a

[9] For example see: Amaral/Magalhães (2002), Huisman/van der Wende (2004), Kwiek (2003), Neave (2003), Pechar/Pellert (2004), Tauch (2004)

[10] see: High Level Group on Human Resources for Science and Technology (2004), European Commission (2003, 2002a, 2002b, 2001) as well as the Web-site of the Forum on University-based Research, which has been established as a High Level Group of experts in September 2004 [see: http://europa.eu.int/comm/research/conferences/2004/univ/followup_en.html]

perceivable shift in students' expectations and demands vis-à-vis university education.[11]

The *internal* forces driving reforms and changes are often rooted in the apparent tensions between research and teaching structures. The former demand more flexibility, a greater responsiveness to the needs formulated by external collaboration partners (in industry, for example), i.e., a readiness to engage in trans-disciplinary research co-operations as well as to invest ample time in more and more management activities. Teaching structures, on the contrary, still tend to remain grounded in disciplines; simultaneously, for university personnel, the teaching loads tend to increase, simply to cope with the continued development of mass higher education; such tensions blur the comparisons made of the value of teaching or research. Both sectors, however, meet similar problems of quality in infrastructures, while the career perspectives they offer are less and less attractive due to inadequate salary structures (that also contribute to brain drain development) - a combination of difficulties that often prove hard to solve.[12]

Over the recent past, universities have been granted more and more autonomy in most of the countries included in this study, which was a way for the State to delegate to the institutions themselves the solution of hard problems requiring clear strategies from government – should the public authorities cope with social

[11] The changing framework conditions and environments that are claimed to give reason for the university reform agenda have been subject of numerous publications. For example see: Farnham (1999), Goedegebuure et al (1994), Henkel (2000), Henkel/Little (1998), Kogan/Hanney (1999), Mora (2001), Neave/van Vught (1991), Schimank (2002), European Commission (2002b)

[12] On the changing framework conditions and career patterns for academic staff at universities, for example see: Enders/Teichler (1997), Gilliotet al. (2002)

change and pressures. As a consequence of devolution, universities face common problems, although their solution tends to vary considerably from one country to the next, or from one institution to the other. One could thus argue that, even if there is an evident trend towards the globalisation or 'Europeanisation' of several difficulties touching the university systems, national traditions or specific institutional histories and cultures still shape concretely the future development of higher education and research. In short, while facing general trends, *locality* continues to play a rather important role.

As a result, this study questions whether or not, for the universities, something like a *post-Humboldtian paradigm* has emerged in the teaching-research nexus – as a result of fundamentally changing boundary conditions. Does this situation stimulate the growth of some major models of organisation or are we confronted with the emergence of fragmented and diversified paradigms in the guidance of academic development? Are new types of issues coming to the fore and which of them do require university action? And what is the shape university autonomy does take in such contexts?

When studying the ample literature analysing institutional change, when reading the documents produced in different national contexts – or at European level –, when conducting exploratory interviews with different actors in the countries covered in this study[13],

[13] We would like to thank all the researchers, administrators, policy-makers and early stage researchers who have spent their time to give us interviews and share their expert visions of the situation in their country. They helped us in a very valuable way to identify important issues, discuss the interpretation of our reading and to check our working hypothesis. However, conclusions, interpretations and opinions expressed in this paper are solely that of the authors and may not necessarily be endorsed by our interview partners.

a number of issues have been identified, which seemed of interest for in depth analyses and discussions. A choice was made however not to enter the detailed, more technical discussion of specific problems concerning the restructuring of the research-teaching nexus in universities: the focus is thus on the underlying questions and trends that emerge as central reference points for the changes taking place in this domain. Five major topics were identified in order to guide our further exploration of what role the autonomy of the so-called 'university' does play in shaping institutional responses to existing challenges.

Before entering the discussion, it should be stressed that the unintended outcome of confronting printed material and interviews concerning the changes affecting the research-teaching nexus in universities from various countries has been the realisation of how different - if not contradictory – are the perceptions of the social actors evaluating the transformations taking place in the system. Even the notion of the 'university', used in a rather broad sense, embraces a variety of meanings. In other words, this study cannot offer a systematic investigation or description that would compare different countries; rather, it is organised around the more general topics that have emerged as important or relevant in the many parts of our enquiry.

The essay is thus structured into six chapters and a concluding section. The first section draws a general picture of the forces presently at work to *reshape the research-teaching nexus* and provides a snapshot of the interactions affecting this interface while highlighting the different areas where reform work is being undertaken. Reference will be made to the context rather than the details of such developments since a simple overview seems sufficient to frame and understand the reflections that will follow in later chapters. On that

basis, five different but interconnected debates will be explored, that cut across the perspectives elaborated in the first section.

Consequently, the second chapter starts by investigating *the discursive environment* that frames the reform work initiated in single universities, in national university systems and at European level. The growing importance of the knowledge economy paradigm is then to be discussed, showing how far it shapes the potential futures of European universities and what consequences this might have at the institutional as well as at the epistemological level.

The third chapter centres on the *repositioning of universities* on the spectrum of all institutions dedicated to higher education: might this influence the shape of the research-teaching nexus within single institutions or in university systems taken as a whole? The obvious diversification and multiplication of tasks in universities is shown to blur the boundaries supposed to exist with other institutions competing in the research and teaching area, thus evoking the necessity for universities to reconsider priority setting, institutional self-understanding and proclaimed identity.

The following two chapters, 4 and 5, draw attention on the particular aspect of human resources within universities now under transformation. Do the changing boundary conditions influence the access to and the development of university research and teaching for impending staff in terms of *professional career* conditions? The fourth chapter focuses on PhD candidates[14] as this group is experiencing the interface

[14] We will use the notion of PhD candidates/students throughout the paper, realising that every national system has a different label and a different legal positioning for this group of people. The differences will be dealt with in some detail in chapter four.

between research and teaching in the most direct and intense way. Doctoral students, indeed, hold a hybrid position within universities considering that, while still in a phase of training/education, they also form a large part of the workforce supposed to produce scientific knowledge. The question of how this mixed role is shaped by different environments should then lead to the crucial challenges that exist in the area of staff development. The fifth chapter follows on these matters by discussing the changing understanding of *what makes the 'higher education profession'*, asking how to reposition 'job'-descriptions and self-understanding, individual aspirations and institutional expectations, externally constructed images and internally experienced realities.

In the sixth chapter we move to the level of the practice and culture of work within universities by addressing an omnipresent but hardly outspoken issue: *good scientific practice* and the deviations from it. This questions how the changing boundary conditions for universities have an impact on the quality of science practice and culture. Such a discussion goes to the epistemic core of the university, as it deals with the ways in which knowledge is produced and disseminated in society, and touches on the values that are manifested in such activities. Recent cases of scientific misconduct, the increasing work pressure on PhD candidates, plagiarism or unclear decision-making (e.g. with regard to decisions regarding the personnel) have brought this issue to the foreground of national and international discussions. Our approach will consist in seeing malpractices not as 'mistakes' resorting to individual researchers, but as indicators of the changes occurring in the research and teaching environment.

The closing chapter dwells on a couple of issues that require further debate since they could represent a

challenge for the autonomy of those universities that are rethinking the place of the research-teaching nexus in their development.

1. The research-teaching nexus in European universities at the beginning of the 21st century

When taking a closer look at the ample literature that has been produced on universities and their changing structures with regard to their teaching and research; at the policy documents written by ministries or other policy makers; or at our interviews with different actors in the field, a number of **arenas** emerge in which the research-teaching nexus is being negotiated, often fundamentally reshaped or, at least, conceptualised in new ways. Five such arenas have been identified.

Laws and regulations constitute the first arena in which the research-teaching nexus is being re-articulated. They define in many ways, more or less directly, the universities' possible future. Indeed, in all countries under investigation, more or less extensive reforms of the university structures have been launched over the recent past. On the one hand, the framework for universities as institutions has been changed - in most cases with one declared central goal, giving the university more autonomy from the State. As already argued in some detail in our 2003 report[15], this has entailed a series of fundamental reorientations within universities. To mention but a few, it meant building new relationships to public authorities; this, in turn, necessitated developing stronger internal governance structures for the institution, since the university was demanded to show greater accountability to social partners; this

[15] see: Felt/Glanz (2003)

implied the development of a capacity to plan the future in coherent and convincing ways, resulting in part in the creation of new alliances with those stakeholders who could become financial supporters. New regulatory regimes brought along new governance structures at all levels of the university; they reshaped financial practices, changed staff contracts or the conditions for the employment of university personnel, thus defining new roles in the teaching that universities could offer or in the research they could carry out. What is common to a great part of the legal changes noted in the countries under investigation is that most legal frameworks have been defined in general terms only, individual institutions being asked to develop the internal regulations responding to specific needs while accounting for special power constellations.

Moreover, the fact that EU member states have agreed to construct a common research and teaching area has had an important impact on the national legislations that concern the university world. As mentioned earlier, the Bologna Declaration (and the implementation steps that followed) has triggered fierce debates in many countries as to whether the harmonisation of study structures represents an improvement for the universities and their teaching or whether it means a step back by inducing universities to set up some kind of school-like teaching units, thus reducing the diversity of higher education institutions that had grown over time, and also causing trouble for their positioning and their building of a strong identity. Indeed, the ministries responsible for higher education had either to impose the new structures through changes at the level of the laws and regulations concerning university studies or to propose strong incentives to encourage their implementation – when they were not doing both. Thus, interviews showed that

even people somehow critical of the Bologna aims and of their impact were clearly aware that it would be hardly possible to 'escape' their implementation.

Next to the Bologna process, the Lisbon objectives must be considered also, since they target the development of a Europe supposed to become by 2010 the most competitive knowledge-economy of the world. Although this is more of a general vision and of an ideological statement than a concrete project - since there is no direct possibility to enforce such aims on the various member states – the document has created nevertheless a highly symbolic and powerful rhetoric that now significantly shapes the discourse within and about the universities. In all the interviews, but also in many policy documents or in the secondary literature, the Lisbon objectives have been described as essential elements of reference for the current reform debates. As a result, the research-teaching nexus is profoundly shaped by the convergence of the Bologna and Lisbon discourses.

This influences the **budgetary arena** where the research-teaching nexus finds concrete shape. Looking simply at the budgets allocated to research and teaching within universities does not mean much; it makes more sense, even at symbolic level, to try and grasp the origin of the budgetary support affected to both areas and their interplay. In Finland, for instance, an interviewed partner clearly stressed the importance of State support in order for universities to reach and maintain high-level positions. Public support is thus seen as playing a central role in building the solid ground on which universities can act and be successful in competitive funding.[16] In Finland, the deliberate choice made by

[16] see: Science and Technology Policy Council of Finland (2003)

the authorities to fund academic institutions heavily - in conjunction with other factors (like the Nokia factor) – has led the universities to develop a strong institutional self-understanding as well as an improved capacity for positioning themselves clearly in competitive environments.

However, even when State support is strong, financial means are increasingly distributed on a contractual basis; this implies that universities and the State reach an agreement on the indicators to be used to assess the amount of funding a project needs. Within this defined frame, universities are then supposed to optimise the conditions of their work. As a result, in quite a number of cases, the financial balance between research and teaching (be it implicit or partly explicit) has become a focus of battles inside the institution. For instance, the questions of which studies to offer or to close down, of which research to prioritise in order to meet the institution's innovation profile, or of how much money to invest in research infrastructure rather than in teaching development have become fundamental decisions that are now to be made within and by the universities. In many of the countries under investigation, there are no general and clear-cut policies regarding these matters in terms of internal issues: this leaves therefore an important grey area where strong tensions are at work. The UK is maybe an exception as the allocation of money among universities is coupled there to research assessment exercises (RAE), a procedure that has showed however clear drawbacks and limitations in the recent past.

As a matter of fact, when defining the balance between research and teaching, there are interesting contradictions and ambivalences to unveil. In the public arena, the teaching needs and high student numbers are often used by the university system to argue for an

increase in State support. High student output (rather than absolute student numbers) is presented more and more to the public as a good use of the budget (also because it can justify the important amounts of money the universities can draw from study fees). However, in the internal institutional arena, high quality research records seem to be valued higher[17] than teaching indicators when it comes to career assessment - and partly also to the distribution of funds.

Indeed, many argue for contract-based money allocations coming from the State as this creates, over a certain period of time, a stable budgetary framework for the institution. However, one should not forget that such a procedure also intrudes deeply into the functioning logic of the institution. Even if there is agreement on the relevant indicators that inform planning decisions, much energy is required to design a research future – that is intrinsically difficult to forecast. Moreover, indicators always risk becoming immune to change, all the more so when, once chosen, they tend to become simple references for institutional and individual actions – much more than necessary. Furthermore, in such a steered logic for their funding, institutions usually need to make extra efforts to allow for the emergence of the exceptional, i.e., to open ways preparing for the unexpected. Without this, universities could cut themselves loose from any real innovation: indeed, most innovations have one thing in common, they are neither planned nor predictable, and they take place most frequently at the border of known work structures.

Moreover, the need to plan for budgetary commitments well ahead of time encourages the tendency to

[17] We already elaborated this point in a previous paper, see: Felt/Glanz (2004)

fragment activities within the university into cost centres easily measured in terms of expenses and output production. Each action taken is thus not only evaluated in terms of its quality and novelty relative to the institutions' core activities, but it is also balanced with regard to its overall financial impact in function of accountability procedures.

The request for researchers to dedicate more fully to the search for monies from different funding agents, be they national research finance centres, industry and other private partners - or the European Union – represents another major transformation in the financial context of universities. The profile of university research has definitely moved away from the ideal of an open quest for knowledge to develop rather into a strongly project-driven type of work that involves multiple financing, changing work relations and growing management support. Universities are now asked to assure their autonomy by entering a web of different forms of dependencies, balancing their research commitments between various industrial partners and diversifying or adapting their fields of investigation to different domains of public interest.

Finally, new ways of accounting for the costs engendered by research and teaching are now getting greater influence on the institution. Thus, both direct and indirect costs can be calculated today along a spectrum of research and teaching processes; in the long term, this could reduce the use of imagination about the potential futures of universities. While this ideology of real cost has already become an integral part of academic thinking in a few countries, like Britain, in others, Austria for instance, such models are just about to be implemented; in particular national contexts (Greece or Hungary in particular) such considerations are absent for the time being. Participation in scientif-

ic projects, but also in teaching activities, reveals the consequences of this ideological shift in many ways. To use the Austrian example in the teaching area, when preparing the introduction of a new curriculum, one has to argue the content, to prove the labour market needs, to evaluate the competing programmes proposed otherwise and to balance the cost-benefit relations. The complexity of this bureaucratic process means that it becomes increasingly difficult to implement innovative teaching programmes when they do not meet a clear social demand already. Study fees have also become an important parameter for the further development of universities. They are both an important source of financial income as well as an instrument helping to manage student numbers. But the issue of fees also appears in quite different constellations, as shown by recent experiences with ERASMUS student exchange programmes in UK universities. As study fees in Britain are rather high compared to continental European programmes and as the number of places in the UK are limited, universities have begun to check rather strictly the balance of incoming and outgoing students. Since UK students - in particular at Masters level – are less mobile than their counterparts on the European continent, the flow of incoming students is perceived, to some extent, as a burden bringing no real income. Thus, the widely acknowledged value of free mobility for students has been transformed under severe financial constraints into a domain of strict regulations and controls. Furthermore, such an example shows that in tightly structured programmes mobility tends to become limited for practical reasons, thus frustrating somehow the idea of a common European higher education area recognised to be the basis for the international exchange of students and teachers.

The third arena in which the research-teaching nexus is being shaped is that of the **governance structures within universities.** We will not discuss all the facets of internal decision-making, but highlight rather the role which governance plays in articulating the value systems of research and teaching in a detailed way, for example through quality assurance and control systems. Governance and its underlying values often induce consequences that are further reaching than usually acknowledged; thus, contradictions often appear between the institution's wish to live up somehow to the expectations formulated by the societal/political environment, on the one hand, and the interests of the staff who want to work without too many external interferences, on the other. Indeed, the discrepancies between the rhetoric uttered by managers within the institution and the realities the university staff is confronted with can often be felt – and recognised - as counterproductive.

Research and teaching (and the balance between these two occupations in particular) offer excellent pretexts to develop such discrepancies. While the unity of research and teaching is stressed in terms of discourse, the evaluations of research and teaching, most of the time, are carried out independently from each other; only in a few exceptional cases are their results interrelated in order to offer a more complete and realistic picture of university work. When activities are considered as making a whole, serious problem analysis can then be done and lead to robust solutions. Similar observations apply to outreach activities, which are often said to be essential for universities (acquiring even the explicit status of a third mission for academia in some countries), although mainly for reasons of public visibility and accountability: such activities, however, are rarely assessed explicitly as full academic assets.

University staff is currently bound to live with these contradictions. Indeed, in an institutional setting where student numbers and teaching loads are high, research is *de facto* being marginalised in the day to day institutional reality, while at the same time the evaluations contributing to the promotion of university personnel tend to put much more weight on research results than teaching duties. As research is valued so highly, and higher than teaching obligations that stay an immutable core of staff contracts, the exit strategy often consists in lowering the level of quality, with regard both to the courses offered and to the level of academic work supervision. The consequences of reduced investment in teaching can be far reaching and urgently require counter-balancing strategies on the part of the management of universities. However, as the problem is not acknowledged openly, stable solutions are difficult to find.

Institutional profile building – and the respective roles that research and teaching play in this definition –, is quite revealing too. The important questions to ask in this context are: is the internationally acknowledged strength of well-chosen research focuses the unmistakable pointer to the quality of a university and are they to become the core of the institution's identity? More pragmatically said, can teaching play a central role at all in nurturing a strong institutional self-understanding? What does it mean for universities to define themselves as 'research universities' when, at the same time, the greater part of their human and time resources do flow into teaching? Does the fact that certain disciplines have to cater for many more students than others, as in the case of social sciences and the humanities, have also a negative impact on their capacity to position themselves high in university priorities? And if universities put much weight on their teaching function and give less importance to the research front,

how can they then manage to keep high internationally recognised quality standards based on innovation practices?

Indeed, if one looks at the different steps taken by universities in various countries we see that a lot of experimenting is taking place in institutional organisation. However, much of what is tried out will only be reasonably assessed in the mid-term. This points to an interesting ambivalence of current university systems: much more than ever before universities are now forced to become experimental; they are thus expected to act and react without having the time to evaluate the changes made; no wonder that they look like moving along zigzag paths that echo the cacophony of set positions. The feeling that simultaneously 'everything is flowing along its own path' creates an impression of fuzziness and insecurity that explains the growing reluctance of academic staff to be involved in institutional and academic reforms – a fact expressed quite often in the literature.

The universities' **human resource policies** represent the fourth arena where the research-teaching nexus is being negotiated. Human resources in academia have become a hot issue at European level since young people (apparently) are less and less attracted by academic careers, a fact that is perceived as a major threat to the development of Europe as a competitive knowledge economy. Thus, the question posed by present career structures is not only to be asked on a rather general level, but also as a key preoccupation for the reproduction and training of qualified human resources - in several technical and scientific fields in particular.

While there are major differences in academic career patterns in the countries under investigation,

some common trends can nevertheless be pointed to[18]: a clear shift away from the model in which higher education staff has civil servant status, a greater fragmentation of career paths, the renouncement to the tenure track model in a number of countries, like the UK, or its downscaling (in the Netherlands), not to speak of the precariousness and low remuneration of the contracts passed in the early phase of an academic career – the expectations for a potential stable future remaining rather vague. Furthermore, with the increasing autonomy of the universities in many areas, the determination of employment conditions has been handed over to the academic institutions themselves, with one restriction only, to conform to some basic employment regulations fixed by government. In some countries, it is now possible to introduce in work contracts a number of obligations specific to the job, such as the expected balance between research and teaching. Like that, the Humboldtian ideal of co-existence between research and teaching seems not to have been abandoned, in principle at least, but it has shifted from the individual to the institutional level since staff now has different teaching and research duties – thus leading to divergent profiles in terms of 'typical careers'.

Thus, it is suggested, the general idea of what academic work is and what being an academic means gets blurred over the different phases of a career. Is there still any specificity concerning universities as a work environment that would make them essentially different from industrial or other public research centres? This has become a challenging question, which should be addressed if a common identity among academics working in a university context is to be recreated. Such an identity cannot be rooted solely in the common

[18] see Felt/Glanz (2003)

basic myths of the university as an institution but needs to be anchored also in the realities of teaching and research. This is of particular importance now when the practice and culture of academic work traditions has to be transmitted to young researchers in a context of competition and scarce resources.

Finally, the **epistemic core** of university activities represents the fifth negotiation arena. The question is whether our vision of what is the very nature of scientific knowledge does also shape the ways in which research and teaching are carried out within the university. If we consider relevant scientific knowledge to be strongly bound to a world of high specialisations, then most academic work is not very much connected to what students learn in their courses. Teaching – at least at undergraduate level – is thus felt rather remote from the epistemic heart of the university and it becomes an unwanted load – both for students and teachers – rather than the core of daily teaching activities that reflect the institution's fundamental nature.

To be more explicit, if one reflects along the analysis made by Gibbons, Nowotny and others[19], scientific knowledge acquires a hybrid character. As it needs to respond to societal change, its production must account for the stakeholders' different interests and develop in a context of cross-disciplinary structures. From this perspective, scientific knowledge takes new formats, the impact of which can also be found in the research–teaching nexus. The social environment thus affects what kind of knowledge is seen as relevant, useful and ethically acceptable. As a consequence, teaching should also take place in a much more participatory setting, for instance by giving a voice to those who

[19] see: Gibbons et al. (1994), Nowotny et al. (2001)

often have simply to listen and to reproduce. This means creating an interactive space between teachers and students that changes the set up in which scientific knowledge is produced, reinterpreted, checked for its relevance and necessity – as well as reorganised in a new, different context.[20] The rethinking of teaching formats thus becomes an adequate response to transformed epistemic values, and this does not just mean the adoption of e-learning techniques! Indeed – and that is the argument put forward by Elkana[21] –, teaching needs to reflect the reality of research in a much more embracing and coherent way, making visible the forces at work, the practices employed and the cultural values on which research is being built. Thus, depending on the understanding of their epistemic core, universities should offer forms of teaching rather different from those usually prevailing in the classroom.

To conclude, if teaching becomes broad and encompasses a variety of different areas, research then can also be funded within universities on a broader basis than on their areas of excellence only. This is confirmed by British experience in particular: if one takes seriously the concept of 'Mode 2' knowledge production and combines it with the issue of knowledge economy, then the graduates should 'have the skills to conduct appropriate research, the capacity to formulate solutions to problems based on awareness of research evidence, and the ability critically to assess the evidence'. (Jenkins/Zetter 2003:11) In other terms, a broader understanding of research is needed than the one used in the British Research Assessment Exercises. This implies, for instance, that – in parallel to the idea that only top research gets funding –, the research

[20] see: Brew (1999)
[21] see: Elkana (2004)

clearly linked to teaching and training should also get decent financial support.[22]

2. Universities in knowledge economies: Rhetoric reframing or a new paradigm for university development?

The emergence of a **knowledge society,** and the important participatory role attributed to **informed citizens,** has been the rhetoric focus for the past two decades in the policy documents that dealt – at EU level, but also in national contexts – with the global trends affecting science and technology. The governance of science was supposed to work in close interaction with civil society in order to ensure a fruitful co-evolution of science and society. When looking at the more recent policy documents now being released, the concept of knowledge society has moved to the back-stage leaving prominence to a different notion, that of **knowledge economy**. This is not simply a question of rhetoric but represents also an important shift in the understanding of the role of knowledge; the consequences of this change of words need to be considered as it affects the development of universities seen as central actors in the knowledge production and education domain for the years to come. In the 1980s and 1990s 'knowledge society' and 'information society' were the key concepts used to describe community transformation; they made of *participation* the focus of inclusion for the diversity of societal players who had handled techno-scientific issues in the recent past.[23] The early 21st

[22] see: Jenkins (2004, 2003)

[23] See for example the Science and Society - Action Plan of the European Commission: European Commission (2002c) [online at: http://europa.eu.int/comm/research/science-society/action-plan/action-plan_en.html]

century however saw a clear shift in this European discourse when a 'competitive knowledge-economy' became the main reference point, a shift reflected by the move away from the inclusion in decision-making of the *society at large* to the use of ***selected** stakeholders* now asked to help shape the future development of science and technology. This means that only a limited spectrum of different societal value systems and expectations are now taken into account when defining policies targeted at techno-science or universities. At present, the emphasis is centred on the economic role both of knowledge and of knowledge workers and the stakeholder notion is defined along similar lines – at the risk of creating simply a society of experts and lobbies.

This shift within the universities towards an economic presentation of knowledge can be traced in a number of ways, both with regard to research and teaching; and it becomes particularly visible when touching the nexus combining the two areas. First, one could point to the fact that, in most countries, the investigated universities emphasised until recently a clear understanding of themselves as organisations for basic research. They saw indeed their main task as producing knowledge, seen as a cultural good for society at large; the development of entrepreneurial features was not deemed essential to meet such an objective. Of course, in the range of existing universities, a few institutions, at an early stage, had developed stronger links to the application of knowledge and stressed their entrepreneurial character; their image, however, was not that of 'classical universities'. The universities' usual identity, i.e., basic research institutions entrusted with a general cultural role, was largely mirrored in curricula that were mainly guided by inner scientific considerations.

During the last decade, pointed criticisms were made about the remoteness of science that did not fit social needs, a distance from reality also shown by the fact that university graduates showed little ability to adapt to the labour market, or that research took place in ivory towers with no or little connection to potential benefits for the community. As a consequence, the cost of the whole exercise seemed unjustified. Thus, in more recent university reforms, when it comes to concrete changes and the definition of objectives, the notion of 'society' opposes that of 'economy or industry' – the latter now prevailing, as a rule. This leads to tangible changes in those institutional structures that aim at facilitating and encouraging new forms of collaboration between the researchers from university and industry (e.g. EU and national research networks co-operating with industrial partners); that is why, today, academic assessment systems are accounting for these new values; special funds are made available to university researchers willing to create start-ups; patents are becoming something worth the university researchers' efforts; and, as for teaching, universities are increasingly competing for the best students by offering more market oriented curricula. The resulting vision of the university is well expressed – and in a rather condensed way – in a recent report of the CREST, the EU Committee for Research, Science and Technology. The fifth recommendation outlined in that paper stresses the need to 'encourage the reform of public research centres and universities, in particular to promote the transfer of knowledge to society, thus facilitating the possible exploitation of their research by industry.'[24] This

[24] see: European Union Scientific and Technical Research Committee (2004), [online at: http://europa.eu.int/comm/research/era/3pct/pdf/3pct-app_open_method_coordination.pdf]

shift can also be traced in the strategies that the universities use to present and 'sell' themselves, a phenomenon with an impact not only on institutional strategies but also on the self-understanding that academics have of themselves or of the institution they work in.

Whereas many politicians welcome such developments, universities nourish more ambivalent feelings on their potential impact. The use of the knowledge economy as a guiding paradigm is thus perceived as a threat to the autonomy of the university since, increasingly, it imposes short-term relationships (that translate into precarious financial connections) with non-academic partners, such linkages making longer term research agendas especially difficult to implement. The metaphor of '*knowledge ecology*' can explain the criticisms addressed to the knowledge economy – when it turns into a paradigm; doubts concern the lack of a clear concept or vision about how to assure sustainability in knowledge development when moving beyond immediate current interests. Needless to say that such a shift in the universities' basic value system touches various disciplines in very different ways; a new emphasis on the short term is often said to create strong tensions between the production of more culturally oriented knowledge and large segments of the natural sciences. This is also reflected in the prominence now given to curricula that are perceived to be clearly oriented to specific market segments by opposition to others that are disparaged for their disconnectedness from concrete labour needs.

On the research side, the interviewees pointed to a couple of structural answers that the universities give to increasing demands for more responsiveness to the needs of external stakeholders. Firstly, policy makers and university leaders seem willing to organise **interactions with the world of business** on stable and high

quality bases. Concretely, offices for knowledge transfer (partly established by some European universities already in the 1980s), provide support for the setting up of large-scale research co-operations (also with industry) and offer guidance for the patenting of new scientific findings. Germany would be an excellent example for a particular kind of 'market enthusiasm' very apparent in federal policy documents.

Secondly, national funding agencies have started special programmes that foster industry-university co-operation. In Austria, for example, one can mention 'A*plus*B' ('Academia Business support for the creation of Spin Off firms), 'K plus' (competence centres fostering cooperative research), BRIDGE (closing the funding gap between basic and applied research) or the initiative 'researchers for industry', where holders of a doctorate are encouraged to acquire key-qualifications for industry and to engage in knowledge transfer and co-operation with outside firms. In Germany, the EXIST-programme of the Ministry of Education and Research wants to stimulate an entrepreneurial climate in universities by motivating institutions and graduates to launch their own spin-offs. Industry-university collaboration is considered a good way to open the minds of academics to the needs of society - even if 'society' boils down to a few industrial players. It is hoped that industry will invest more into innovation, a move also deemed to be at the advantage of basic research, at the other end of the spectrum. Thus, the rigid boundary that formerly separated purely academic investigation from more business oriented research is becoming much more permeable. This often implies, although in an implicit way, shifts in the value systems that structure academic awareness.

Thirdly, to support our hypothesis, universities – much more than before – are addressing issues of patenting and ownership of knowledge: innovation has

become a buzz word indeed. While fundamental differences between countries exist concerning this question, it is also true that researchers now realise that patents could have a value somehow equivalent to that of academic publications. However, it is understood too that much of that value is rather symbolic, researchers knowing well that little financial impact can be derived from such patents for the benefit of their own universities[25]. Yet, patenting supposes evaluations that deeply intrude in the perception of what is important and worthwhile in the production of knowledge: all this finds expression in multiple decision-making contexts within academic institutions.

On the teaching side, the idea of closer collaboration with industrial actors has led to changes in certain educational settings, introducing – or valuing higher than before – practical training on the labour market considered to be part of an academic education. While this has been already an integral part of more technically oriented curricula for quite a while, practical training gets now included, little by little, in social sciences curricula as well as in other subject areas. Furthermore, co-operations with industrial partners are emerging in which the choice of topics for a masters or PhD thesis depends on industrial partners since the students carry out part of their research in extra university environments such as firms and companies. Finally, courses on planning, on business management and law are increasingly added to curricula in non-economic disciplines with the aim to broaden the competences of future researchers at an early stage of their development, thus making social skills an integral part of their self-understanding.

[25] This was explicitly stressed from Finnish and German side.

Making the knowledge economy the basic paradigm for the reform of the university system has also brought about concrete shifts in quality assessment and assurance procedures. Thus, the focus of interest has moved away from input oriented indicators to clearly output defined measures. As for teaching, this has led to much attention being given to an 'economy of time', in which efficiency means shorter study cycles, more streamlined curricula – at the risk of mainstreaming teaching (and, indirectly, research also). The problem of too high an average duration of studies has been mentioned as a central matter in virtually all our interviews; the shortening of study time has thus become an important driving force for reforms affecting the teaching-research interface. Ideally, students should progress quickly in their basic education, then move immediately to graduate education *or* find a place on the labour-market outside of universities, institutions they could come back to at a later stage of their life. The doctoral phase should also be kept as short as possible and meet clearly defined quality criteria. In a knowledge economy, a qualified workforce is supposed to enter the work cycle rather early; thus, it should be flexible and mobile, as well as ready to get back into various learning situations at different stages of existence. In such a context, dropouts become proofs of the system failure, i.e., indicators for an inefficient education. The debate, thus, turns around creating structures that help manage training through clearly structured programmes, better supervision and some financial support able to attract the best students; those 'not fitting the system' should stay out and be encouraged to leave higher education at a relatively early stage of their studies.

However, this is not enough to produce – and using such a word is a deliberate choice – a sufficiently educated workforce; graduates should also meet the expec-

tations of the labour market (that differ considerably from one disciplinary area to the next); in some technical disciplines, this is an old debate. What is new today is the extension of such a fit-for-labour orientation to all academic fields, including the humanities and the social sciences. This introduces a powerful and new symbolic divide between the different fields of scientific investigation and teaching, some areas positioning themselves as 'useful' in terms of the labour market, others struggling with a stigma of social inadequacy. This has reopened the often discussed question of whether universities should offer training for jobs or, rather, develop in students a broad and basic scientific education that can be elaborated further in the work environment itself. In the German-speaking world this conflict of visions is summed up in the well-known dichotomy between '*Bildung*' and '*Ausbildung*' (education vs. vocational training); in other national settings, different forms of 'professionalisation' have emerged in function of the cultural histories of higher education that prevail in the area. One pointer to on-going changes in the field is the recent creation of so-called 'professional doctorates', for instance in the UK where professional doctorate programmes first appeared in the late 1980s before their number grew in the 1990s to reach some 150 PhD programmes in 2000. They focus mainly on engineering, education and management; thanks to cooperation with industry and business, they also propose doctoral studies strongly linked with professional development and practice.[26] Other countries want to revisit the relation between their '*Fachhochschulen*' (Polytechnics) and classical universities.

As to the universities' output of knowledge workers, their sheer numbers are secondary to the field they

[26] see: UK Council for Graduate Education (2002)

graduated in. People have recently expressed worries about the rarefaction of candidates in fields of natural sciences and engineering studies. This trend, particularly stressed in Dutch interviews, has become a real policy issue at European and national levels. This apparent lack of interest in specific studies has encouraged communication initiatives – that try to demonstrate the attractiveness of science – as well as the launch of special programmes that attempt to attract to these fields young women in particular. One such national programme for girls willing to take up technically oriented studies (and aiming also at the better integration of women into natural sciences and technology) is the Austrian fFORTE project (*Frauen in Forschung und Technologie*/Women in research and technology), that embraces a broad variety of actions going from communication to financial support for female researchers and students; it also funds research trying to understand better the mechanisms explaining disinterest.[27]

The evaluation of the universities' success in implementing the changes made necessary by the shift towards a knowledge economy is not left, however, to institutional goodwill alone. Different social partners have entered the field[28], such as supervisory bodies that include members from outside higher education, i.e., representatives of society who play an important role in university governance. Furthermore, in many of the countries investigated, feedback from actors in the

[27] This programme is an initiative launched by the Austrian Council for Research and Technology Development and the Austrian Federal Ministries for Education, Science and Culture, for Transport, Innovation and Technology and for Economics and Labour. See: http://www.fforte.at/

[28] see: Felt/Glanz (2004, 2003)

society at large is requested about the content and structure of the curricula that are in the process of definition or re-definition. These external actors usually represent the professions, trade unions, potential employers as well as graduate organisations – not to mention student associations.

Finally, the paradigm shift entails some competition between universities for good students, until recently a rather marginal phenomenon among European universities - with a few national and institutional exceptions however. This explains why ranking exercises start to play an important role, as one of the German interview partners has stressed. Universities, even when they criticise the methods used in such rankings or their results, try nevertheless to adapt to the applied criteria just to be sure of a higher position in the pecking order.

Coming back to the question posed in the heading to this chapter, namely whether the 'constant talk about knowledge economy' is just a passing rhetorical fad, that will have only marginal influence on the university world, or whether the knowledge economy is a new paradigm that will frame the European universities' potential futures, there is clear evidence that economic references are influencing deeply already higher education and research. It is perhaps too early to judge their impact even if related changes are taking place with a growing frequency; it is difficult to perceive yet the possible convergences of the single steps taken, but the global impression given by the actors in the field leads to believe that changes are far more important than a simple reframing of the rhetoric. At the same time, the universities have always managed throughout their history to develop some sort of resistance to change when their core values seemed threatened. Thus it remains to be seen how deep the present

changes will actually manage to intrude the epistemic core of the enterprise.

3. Institutional repositioning of universities: Multiplication of tasks and identity recreation

For a long time universities have been the unquestioned central players in the field of basic knowledge production as well as of higher education. With the gradual transformation of the universities' boundary conditions over the last decades, the pressure rose to reconsider the set of their basic values; to take up new tasks and to redefine their place among new institutional players, who had appeared on the horizon of the higher education and research field. Thus the implicit as well as the explicit self-understanding of universities is now being challenged, so much so that adequate mechanisms to recreate institutional identity need to be devised.

Indeed, when studying the collected material and when listening to interview partners, it became evident that the universities experience strong **competitive pressures** which are rooted in a number of changes.

Firstly, over recent years, the European continent has lived through an unprecedented rise in the number of private elite higher education institutions, all trying to conquer a share of the market for excellent students and wealthy financial backers. High tuition fees, selectivity concerning access, resources from powerful industrial partners and much better working conditions for staff and students represent key assets for these institutions. Public universities are then forced to deploy new strategies in order to position themselves and retain their attractiveness and quality. The recent Austrian debate on setting up a 'University of Excellence' – to be partly financed by state money – reveals

what is at stake: the complementary role that new elite institutions could play to counter the difficult situation now prevailing in mass education institutions. While there are voices in favour of elite institutions that would offer excellent research conditions, in some areas at least, critics stress that such a move would represent an escape from the need to invest into existing university structures, i.e., from the need to improve mass education. This would further question the long held ideal of an open access to universities and of the social role higher education plays in the building of modern societies. In the Austrian case, the Minister for Education, Research and Culture has fuelled the debate by saying explicitly that the creation of elite institutions is an important step for the nation to remain competitive - being able, that is, to play in the top scientific league. In other words, 'ordinary universities' are no longer perceived as capable to meet the quality challenge. Whatever solution is chosen, the question remains of how to compare elite universities with classical institutions.

Secondly, on the teaching front, universities have to position themselves in relation to vocational institutions of higher education like the *Fachhochschulen* in Austria and Germany or the higher professional schools (HBO) in the Netherlands. The latter promise their students enhanced job opportunities when joining the labour market after graduation. Their curricula are generally more clearly structured, follow stricter time schedules, involve more actors from outside academia and offer the advantage of shorter study times and lower drop outs rates when compared to classical universities.

Thirdly, in terms of research, universities have to compete with state-funded research centres, like the CNRS in France or the Max Planck Society in Ger-

many, institutions that offer better working conditions to young researchers starting their career and that successfully compete for funds with rival university departments. Having no teaching obligations, the staff of such centres can focus exclusively on research and, at the same time, promote the access to their networks of young and qualified researchers.

Fourthly, universities are challenged by for-profit institutions that use new information and communication technologies to offer e-learning opportunities linked to quick and easy access to higher education degrees; such providers can also propose education in a continuing learning mode that fits well the needs of a knowledge driven economy. A whole new global market is thus opening up, especially at Masters level, where it is easier to offer a rather narrow spectrum of specific courses.

Fifthly, universities have finally to confront competition within their own walls, between the different goals and tasks they are supposed to meet, all such objectives trying to impose their own logic onto the overall functioning of the institution. The offer of good quality education to a broad spectrum of people (and the resulting social role important for the reproduction of society) represents one set of values at work. Simultaneously, the research side pushes for excellence and productivity, notions that suppose different expectations about the functioning of the institution or about student education. New tasks like the organisation of lifelong learning activities or the creation of sustained outreach programmes should not be forgotten as they also compete for resources in terms of manpower and infrastructure. As Nowotny and co-authors point out: "This tension between the desire to preserve or enhance 'excellence', now defined in terms of scientific quality and research productivity (but formerly in

terms of broad cultural and social-class considerations), and the need to satisfy the popular pressure of increased participation, appears to confirm the existence of an inescapable contradiction between the university's scientific and social goal." (Nowotny et al. 2001:87)

These different but partly overlapping and contradictory competitive settings explain why universities are having difficulties to position themselves in a rapidly changing environment. Moreover, since solutions seem no longer to be formulated at national or regional levels, universities are now challenged to find their own 'best way' to deal with the problem. Solutions thus become local and tailor-made; they require high investments in time and energy but offer little guarantee as to the success of the chosen strategies.

A closer look at competitive university duties points to a multiplication of tasks in each single institution that is unprecedented in the history of higher education; this multiplication induces an important reorientation in institutional development, thereby questioning traditional profiles and identities, existing hierarchies and accepted rationalities, in short the universities' capacity to adapt to a new environment. Beside research and teaching, usually considered to be their core activities, the universities have entered new sets of activities indeed.

The search for sufficient *external research money* has become a key task for contemporary universities mentioned in practically all the discussions that concern changing the university system. Indeed, talks about a structural crisis and the lack of sufficient funding are not new; over the last decades, they represented a recurrent theme of the debates about restructuring the sectors of education and innovation. From the

1970s onwards, indeed, the universities have been increasingly urged to acquire additional resources by competing for projects sponsored by public and private funding agencies, be they large-scale EU programmes or contracts proposed by industry. Over the recent past, however, the need for external funding has grown more acute, so much so that ensuring financial support for one's own investigation is today perceived as an integral part of the researcher's activities. This trend has been reinforced by the increased autonomy of the universities, since their self-development often brought along full accountability and the responsibility for their financial viability. Autonomy from the state has thus translated into a variety of new dependencies, this time from external funding agents. The acquisition of important financial means has also required considerable time budgets in order to write and negotiate research proposals, to develop adequate structures for the handling of large cash flows, to keep full research records to convince those supposed to finance the projects. This has induced researchers to tailor their investigations in such a way as to meet at best the financing conditions that are often formulated outside of academia.

In order to attract important budgets, universities must indeed develop research projects that espouse general societal needs. Thus, more than ever before, academic institutions need to enter *collaborations crossing sectors and disciplines*. The direct and indirect costs of intense co-operative and networking activities, i.e., the 'social investment' and time they represent, are however often underestimated. Interviewees described these new and often rather large networks as fruitful but also as cumbersome since they are not without frictions; it was thus underlined how long and tortuous the path can be towards defining the common ground on

which to collaborate.[29] Moreover, such networks have become areas of special interest for doctoral students asked to combine both academic and business cultures, two worlds that they sometimes find difficult to serve simultaneously. As a result, complex and large transversal collaborations are now deemed to be important 'social and institutional investments' that, however, do not always pay back – thus representing in fact a rather risky investment.

The description above clearly demonstrates that the *management of research* is playing a growing role in the universities' everyday life. Given the process of contemporary research, management tasks can no longer represent a simple side activity that is easily combined with normal research and teaching duties. It is a job of its own that demands specific personal skills as well as resources in terms of money, time and manpower. As a result, the image of the ideal scientist has begun to shift, a fact reflected not only in academia but also in the media. References to the classical research figure, a man of genius whose life is devoted to research but who lacks social skills and gets lost in the 'real world', are vanishing fast to make place to new media stereotypes, such as the knowledge champion good at 'selling' science, i.e., a person apt to negotiate not only with policy makers and representatives from industry but also with the leaders of his own institution, a person able not only to attract sufficient funding but also to lead coordinated research programmes. This new image makes of researchers hybrids of science managers and of excellent scientists.

[29] This point has also been elaborated in the literature. For example see: Jacob (1997), Krücken (2003), Landry/Amara (1998), Loan-Clarke/Preston (2002), Morris (2000)

Apart from changes in the image of people, the structures within universities have also been modified to adapt to the new challenges. Indeed, to be successful, research in today's universities needs not only adequate infrastructure and equipment but also specific management procedures. From a research perspective, the metaphor for academic institutions is of a conglomerate of small and medium sized enterprises that are intent on the production of scientific knowledge; they run somehow independently from each other while being held together, however, by a set of somewhat common rules. As a consequence of the reduced dimension of basic units, the number of contract researchers has risen so much that, as a highly precarious group, they influence the overall development of the institution.

Knowledge production and publication in academic journals no longer suffice for visibility. In many research fields - in particular in the natural sciences where the bioscience sector is to be mentioned – scientists need to consider the *market positioning* of their research thanks to patenting processes and the creation of spin-off companies. Such worries touch only a small segment of the disciplines represented at universities; they have an important place however in the preoccupations of science policy makers and university leaders.

Beside these additional tasks related to the research now developed in contemporary universities, important changes appear also in the teaching process. Two seem particularly central: the increase in *e-learning activities* and the emergence of *lifelong learning* as a university responsibility in Europe. Practically all interviewees reacted to questions about the changes in the teaching and learning sector by reflecting on e-learning. Over the last few years, many universities have elaborated policies in this field, establishing special task

forces or programmes to foster e-learning, putting in place the technical support needed for learning platforms or taking part in research projects funded at national or EU level to gain a better understanding of the phenomenon. Despite a rather fast development of the sector, universities are still at very different stages in their integration of information and communication technologies in the education and training system. The European Commission underlined in its April 2005 call for e-learning that higher education institutions "face a challenge in progressing from a project level to a strategic level that encompasses the institution as a whole and where e-learning is mainstreamed in education, training and research in a sustainable way supported by organisational, educational and economical models. To engage in this process requires from the institutions organisational maturity and willingness to support necessary change at all levels. There is no ideal 'one size fits all' model that reflects the various situations of European universities regarding the development of virtual campuses."[30] For the present study, there is no need to enter the technical discussion on the logistics and use of ICT in teaching; however, it is worthwhile noting why universities take up e-learning activities: some consider these new technologies as an opportunity to renew the learning process and adapt it to the students' different needs; others see in their use a pragmatic solution to a situation of overcrowded lecture halls and seminar rooms where contemporary mass higher education shows its limits.

[30] see: European Commission: E-learning. *Designing Tomorrow's Education*. Priorities and award criteria for the Call for proposals, 2005. Decision of the E-learning Committee, 19th April 2005 [online at: http://europa.eu.int/comm/education/programmes/elearning/doc/2005/priorities_en.pdf]

As for lifelong learning – that opens completely new approaches to teaching activities in universities –, its concept now pervades much of the policy discourse. As the *Trends III* report[31] showed in its appraisal of the Bologna process, the asserting of LLL must be seen as 'a particularly striking development, both from the point of view of rapid increase of users' demand and from that of a rise in political awareness, since it reflects profound changes in the status of knowledge and skills in society, changes which are and will be affecting universities more than their leaders may currently be able to address.' Indeed, the real challenge for institutions of higher education is the shift LLL requires from teaching to learning, i.e., from the aims and values of academia to the needs and aspirations of students. This also explains, in part, the ambivalence with which universities receive the growing call for more life-long learning activities within their walls. 'Proponents of such a demand orientation see LLL as a key to opening the doors of higher education institutions to the outside demands of society. Critics fear that the critical distance and uniqueness of universities in thinking ahead, beyond current demands and markets, is being undermined by such an orientation.'[32]

When taking a closer look at what really happens in terms of LLL activities in universities, an interesting discrepancy becomes clear between, on one side, the high level of engagement announced in policy discourse and, on the other, the concrete development and comparatively slow progress manifested in the institutionalisation of such programmes. Thus the need for more LLL activities seems undisputed, while implementation stays rather uneven from one country to the next. Overall, universities so far offer only about 10% of their pro-

[31] see: Reichert/Tauch (2003), p. 89
[32] Reichert/Tauch (2003), p. 90

grammes as continued education, leaving unexploited a high potential for expansion. Reasons for such a restrained participation could be a lack of marketing awareness (universities tend to underestimate their unique position at the interface of knowledge production and distribution) on the one hand, and maybe, on the other hand, a certain reluctance to enter this new field. From the countries investigated in this report only Finland, France, the Netherlands and the UK have developed until now specific national policies regarding LLL. But even there, individual institutions give attention to LLL activities more in their discourse on strategies than in everyday practice – often a rather rudimentary affair still. This is nicely reflected in *Trends III*[33] when the survey shows that about one third of higher education institutions develop an overall strategy to offer LLL, while another 5% clearly refuse to engage in this field, the remaining majority demonstrating only a diffuse interest in the issue. Indeed, there is an obvious correlation between actual involvement and policy measures. Countries with clear national policies like Finland, France and the UK are also leading nations in the LLL involvement of their academic institutions. Higher education institutions in Germany, Austria, Italy and Hungary – with little global support – stand at the other end of the spectrum, i.e., low commitment, even if, in Germany and Austria, there existed before World War I a strong tradition in adult education.

A closer look at the institutions reveals other interesting variations following the disciplinary orientation of the course provider: universities specialised in business and economics are far more active than others, a

[33] For the more detailed results of the Trends 2003 survey concerning the reality of LLL at the institutional level see: Reichert/Tauch (2003): 94ff.

fact perhaps linked to the market orientation of such programmes. Indeed, over the past few years, equity of access, e.g. the key justification for LLL in its early development phase, has been gradually abandoned in favour of more career-oriented objectives. Thus, LLL offers are now conceived less as a social duty for publicly funded research academic enterprises than as a tool for institutional visibility and a source of tangible income. As public funding and supporting grants lack in many countries, the students are required to pay the full cost of the programmes. This is particularly well documented in Spain where practically all LLL activities are performed by public universities which, in this area however, function as private institutions – thus remaining inaccessible to people with low incomes.

The last group of new tasks that universities have been led to take up concerns their *communication* needs vis-à-vis the wider public. Because of rising external pressures for accountability and legitimisation, because of the universities' increased autonomy, institutions are more aware of their own vulnerability and of the need to solicit public understanding for their work. A number of countries, moreover, have been confronted with a decline of student numbers in certain areas; they reacted by promoting attractive interaction programmes for the younger generation (programmes that targeted in particular women participation in specific domains). PR became a contribution to solving credibility problems. In the same vein, some areas of research were faced by a rise in public scepticism as to the knowledge developed in academic circles (e.g. genetic engineering); thus, improved communication, there too, was seen as a major way out of a situation of lost prestige.

As a consequence, over the past decade, universities have multiplied their outreach activities to reposition

themselves in the public space.[34] University teachers are now expected to have regular contact with the media, to give interviews and public lectures, to join science weeks and other festive activities, to organise open door events … and the list of such activities could be easily lengthened. This has led institutions to set up public relation departments in an attempt at positioning themselves in a competitive environment. While the importance and value of increased interaction with society is recognised as essential at leadership level, communication activities still count very little in the academic evaluation system. In other words, personal investment in this direction is usually seen with a certain amount of scepticism by the researchers.

As in LLL activities, the weight of PR for science varies greatly between different nations, institutions and individual researchers. Following the strong commitment of European leaders to 'science and society' issues,[35] most countries, however, develop a common policy discourse on the necessity for science to engage better with the public, an urge that has been taken up by most universities indeed. Yet the degree of concrete involvement in public debates changes from one institution to the next and drawing a clear picture of the present state of affairs is difficult, also because the academic communication landscape is changing very rapidly.

Considering the proliferation of tasks that universities are expected to take up next to 'normal' research and teaching activities, there is no wonder that they find it rather difficult to integrate smoothly the many facets

[34] For an extensive analysis of the situation of science-society interactions in different European countries see: http://www.univie.ac.at/virusss/OPUSReport/

[35] see: European Commission (2002c)

of such operations into a coherent new form of self-understanding. In their documents and self-descriptions, universities often give the impression that they need to respond to these many demands simultaneously – even if they claim at the same time that multiple services risk making their selection of priorities irrelevant. The capacity to devise and adapt to long term strategies has thus become a key issue for institutions and for university systems drowned in a sea of requests: with a newly gained autonomy status, institutions are now understanding that their stability can only derive from a clear identity and a unique institutional profile. No general solution has been found yet although several experiments have been made. Some countries have decided to include these various complementary duties into the profile of the individual researcher. In the case of outreach activities, to take but one example, the Nordic countries have opted to group them in a 'third mission' next to research and teaching, thus giving them a clear value in university work. Similar procedures could be imagined for most of the tasks mentioned, should they find their place in the structure and self-perception of single universities, and thus become clear points of reference rather than haphazard duties emerging from an undefined grey zone of activities. This means open discussions on how so diverse responsibilities relate to teaching *or* research as well as to teaching *and* research, seen as the two sides of the same coin. Taking into account the interviews made with representatives of PhD students, the importance of actively integrating these new tasks into the world of teaching becomes obvious. This means addressing explicitly issues such as the raising of funds, the writing of project proposals, the organisation of outreach activities, the communication of science to non-specialists – as they affect the curricula or as they are tried out in experimental courses.

Indeed, academia is not confronted simply with an add-on situation in which adequate solutions have to be found inside universities to handle each activity on its own, as effectively as possible; what is at stake is a qualitative leap that can integrate an expanded spectrum of activities; within the framework of these new conditions, this calls for a redefinition of universities as institutions. New grounding, new blending and new balances are required to re-engineer the academic institution as a social partner of a society in constant flux.

4. The scientists of tomorrow: PhD students and their multiple roles within universities

The broadest theme that came up repeatedly when investigating the changes at the interface between research and teaching touched the **production of tomorrow's scientists.** We use deliberately the notion of 'production' as many of the problems described below come from the massification of higher education and from the growing interrelatedness of universities with the economic system.

Over the recent past numerous have been the studies, policy papers and statements that representative organisations have dedicated to PhD students: awareness is growing that this group of young researchers plays a fundamental role in the development of the university system of the future.[36] To offer a clear analysis

[36] As an indicator for the increasing awareness of the issue, one can name several conferences organised by various actors at European and at national levels, meetings where questions about PhD training are increasingly raised. For example see: EUA Conference on 'Research Training as a Key to a Europe of Knowledge', Maastricht, 28-30 October 2004 [http://www.unimaas.nl/eua/index.htm] or the EUA Bologna Seminar on 'Doctoral Programmes for the European Knowledge Society', Salzburg, 3-4 February 2005 [http://www.eua.be/eua/en/Salzburg_Seminar.jspx].

of the current situation is however difficult as practically all countries under investigation are structured differently, face other postgraduate problems and imagine divergent solutions to their difficulties. In Europe, the PhD students' status differs from being university employees in the Netherlands, for instance, to holding a position of 'scientific collaborator in education', as in Austria; in many other countries, they retain the rank of 'simple' students. Important differences also occur within the same country as far as working conditions of PhD students are concerned. Situations vary among academic disciplines, some receiving, for instance, a kind of State financial support planned for doctoral students (like in France where the number of PhD stipends is relatively higher in the natural sciences than in the humanities); they also vary among institutions, a few organising structured programmes, if not graduate schools, while others do not offer special PhD training at all. The responsibility for doctoral supervision is sometimes left to the interpretation of a single figure, the mentor, while, in other cases, PhD monitoring is regulated by internal rules or entrusted to a team of teachers. As to the market value of a doctoral degree, it varies considerably from country to country. In German speaking areas, for instance, the doctoral title strengthens employment prospects and has a high symbolic value while, on the French labour market, it is of no advantage in most economic sectors. As a result, it is difficult to assess the predicament of European PhD students as a whole, their problems varying too much. The ample literature on this topic is a good illustration of that fact.[37] The role of the

[37] To get an overview for example see: CHEPS (2002), Clark (1993), Huisman/Bartelse (2001), Kupfer/Moes (2003), National Science Foundation (2000), Roland et al. (2002), Sadlak (2004).

PhD, as an achievement, or of the PhD student, as a person, reveals how far reaching is the influence of history and of the culture shaping different national university systems – or single institutions – in the development of the research-teaching nexus.

Considering the issue from afar – that is without entering the details of doctoral training –, four main groups of questions emerge to focus the discussion. They all reflect the fact, in most of the countries under investigation, that universities (or university systems as such) have been granted the autonomy to intervene in doctoral issues, thus shaping in novel ways the interface between research and teaching in function of the challenges evolving from a changed environment.

A first and rather straightforward question can be asked: what is the aim of PhD training in contemporary universities? This demand is not so strange considering the fundamental changes that have occurred over the last ten years in the boundary conditions defining universities and higher education in general. When asking different actors in the field about their expectations from PhD training, the variety of answers is stunning, be they from interviews or from the positions outlined in student magazines, policy papers, or articles published in academic journals like *Science*. A simple monitoring of input and output data is no longer sufficient to assess the results of doctoral training in universities or to infer that the system is moving in the 'right' direction; much more revealing is a closer look at the reform processes taking place in academic institutions since they offer different perspectives on the PhD as both a learning and professional path for young people considered to have completed their formal training already.

A major change for universities, with the massification of higher education, has been the smaller propor-

tion of students ready to make a career in their own scientific field as compared to the many graduates 'produced' to serve knowledge on labour markets outside the academic world. Implicitly and explicitly, this pattern of change questions the functions assigned to the PhD. Does it exist to reproduce academic and university structures or is it to offer also professional competences for joining a highly qualified labour market supposed to absorb young doctors, their studies once completed? Surveys of PhD students show that their first expectations are to make a career in the research field, at the university if possible. However statistics indicate that in many countries such hopes are fulfilled by a tiny minority only, a fact that also reflects the restricted number of permanent academic positions available. Taking PhDs in life sciences from France as an example, only 29,4 % of the doctoral graduates find a permanent position in academia two years after finishing their degree and, passed this delay, the probability of success in finding a stable research position declines rather quickly.[38] A similar picture may be drawn concerning post-docs in the Netherlands. If, in 1999, 85 % of them had expressed their wish to work in academia, only 12% held a stable university position five years after finishing.[39]

In many countries the unsatisfactory career perspectives for PhD graduates within universities have to be seen against the backdrop of contract policies for academic staff linked to the expansion of tenured track positions over the past decades. While the latter ensured the university system its necessary stability, they also led some institutions to set up rather inflexible personnel structures, thus raising the age average of research staff.

[38] see: Dany/Mangematin (2004).
[39] see: Lorenz (2003)

Some have reacted by decreasing the number of permanent positions, but found it a challenge to reach a balance between stability and flexibility. That is why many stress that the best service to offer students is to draw their attention on the limits of an academic career and on the highly selective process that leads to it.

The fact that universities offer education to two rather different target groups, without individual students being clearly assigned to one of them, creates a number of problems on the teaching side. These range from the content of curricula (defining the skills and values to be transmitted in a university education at doctoral level), to the characteristics needed by the teachers addressing high level students, or to the learning structures best adapted to doctoral purposes - not to speak of more practical questions like study fees and entrance exams. In many ways, this fundamental shift has been ignored for long even if, in a few countries only, account has been taken of the dichotomy of purposes by setting up differentiated doctoral programmes, some answering academic needs, others external labour market requirements.

The employment of PhDs being influenced by market shifts, stakeholders have also begun to ask for a better definition of doctoral education, making thus its reorganisation all the more urgent. If we take the Lisbon agenda seriously, the rise of research and development expenditure to 3% of the GDP should result in an unprecedented need for scholars in a variety of specific fields. Consequently, universities, in collaboration with other institutions, could be called in the future to educate an ever increasing number of young people at doctoral level. This implies innovative answers to the challenge of high quality training – especially since greater amounts of public money are not expected in the next few years. As was emphasised in a recent rec-

ommendation of the Commission concerning the *European Charter for Researchers* and a *Code of Conduct for the Recruitment of Researchers*[40], 'the identified potential shortage of researchers, particularly in certain key disciplines, will pose a serious threat to the Union's innovative strength, knowledge capacity and productivity growth in the near future and may hamper the attainment of the Lisbon and Barcelona objectives.' Indeed, producing qualified PhD candidates is not only perceived as a key educational issue but also as an important economic factor. Thus, as outlined in the previous chapter, the lack of attractiveness among young people of certain research areas is often considered to have become a key problem for the future development of society: universities are therefore challenged to find ways to regain scientific glamour.

At the same time universities are more and more conscious of the fact that their own continuity can only be assured by high quality PhD education; and this entails striking better relations with those students wishing to enter a research career. During the last ten years, because of a more project-oriented style of research, PhD students have taken over a growing part of the knowledge production activities developed at universities, the latter using them also to renew their staff. Indeed, in the research field, doctoral students represent a rich pool of human resources and, often, the only really flexible workforce available – a fact that was stressed in several of the interviews.

If we are to answer our first question, it seems that PhD training evokes high and partly contradictory expectations. If PhD programmes are clearly aiming at creating a highly qualified workforce, the requirements future doctors will need to pursue a career after finish-

[40] see: Commission of the European Communities (2005)

ing their thesis remain very unclear. For the academic institution, the challenge lies in the need for a more precise understanding of the possible work setups to which graduates could contribute – each environment implying specific skills in order to meet particular job expectations: how far, however, are universities equipped and ready to train for such competencies? Academia has to define what can be offered in function of given conditions of funding, staff and infrastructure rather than go on answering such a fundamental question in a very idealised way.

This remark brings us directly to the core of our second question: What is the role PhD students play within universities and the system of scientific knowledge production? Should they be regarded as the backbone of university research - getting valued and integrated in the system accordingly? Or do they simply represent a large workforce, flexible and cheap, that allows universities to improve their ranking status at a reduced cost?

This is indeed a pressing question considering the usual and growing complaint about the *brain drain* of young researchers from Europe to the US, a trend reinforced by the declining attractiveness of PhD positions in some countries, like the Netherlands, where in a few fields foreign students are brought in from abroad to fill an increasing number of vacancies. Indeed, what holds true for most countries – although in varying degrees – is the fact that the majority of PhD students are no longer financed through State stipends or positions; their employment – if their doctoral research is financed at all - is more and more linked to precarious activities depending on projects made possible by short or mid-term national and international funding. A recent *Nature* article on PhD students in Europe made

the point: 'Half a million junior researchers, such as PhD students and postdoctoral workers, form the backbone of Europe's scientific pursuits. How many of them are employed under ill-defined conditions can only be guessed.' (Schiermeier 2005:540)

In other terms, the situation of PhD students or candidates, also called 'early stage researchers', is far from satisfactory – even if conditions do vary from a country to the next. In the Spanish system, when preparing a PhD, the doctoral candidate retains student status; this means no labour right or social protection unless hired for a specific research project. Some changes are in the pipeline, thanks to the 'grant holders' charter newly approved by the Spanish government that recognises at least some rights to 'early stage researchers'. However, the grant-funding agency is still to implement the charter that could reduce precariousness! This explains why active and mobile students prefer getting a better position in foreign countries.[41] To give a second example, only 225 scholarships are offered annually by the Greek State on a competitive basis; as such grants are not sufficient to live from, their holders are forced to work - in parallel to their studies. Precariousness thus entices PhD candidates to accept any additional work they can get their hand on: teaching duties, for instance, or badly rewarded assistance work in research projects. As a result, they usually suffer significant delays in their training.[42] According to a study done by

[41] On the situation of PhD students and early stage researchers in Spain for example see: *Federación de Jóvenes Investigadores - Precarios* (2003, 2002), Pain (2004), Romero (2003), Young Researchers' Federation – FJI/Precarios (2004)

[42] see: answers to the questionnaire prepared by the Greek delegates for Eurodoc 2004 [online at: http://www.eurodoc.net/questionnaires/Greece.pdf] as well as for Eurodoc 2003 [online at: http://www.eurodoc.net/docs/eurodoc03book_country.pdf]

the German doctoral students' organisation THESIS[43], the most important reason mentioned by doctoral students for interrupting their dissertation is the work obligations that, in parallel to their own PhD research, they have to fulfil in administration and in different other projects. Moreover, when doctoral students are hired on project funds, it is not uncommon for them to depend on a series of successive short-term contracts, a fact that makes even more difficult to make compatible the substance of their thesis with their project work.[44] Indeed, such a situation can only be considered as unfortunate, particularly when the necessities and timelines of the research projects doctoral students are paid for contradict those of their own research, thus delaying results. The responsibility for PhD work is in most cases left to the students, individually, their efforts receiving little consideration at a more institutional level. In the Netherlands, a debate is now raging on the pros and cons for the re-introduction of PhD studentships (the so called *bursalen*) that would offer an alternative to the employment status now granted to doctoral candidates. While the Dutch Universities' Organisation (VSNU) stresses the flexibility universities would get from the possibility, case by case, to decide whether to award an employment contract or a studentship to their PhD students, the latter fear that flexibility will mean extra difficulties to obtain an employee status that is more advantageous both in terms of payment and social benefits. Re-introducing the possi-

[43] see: THESIS (2004)

[44] This problem has also been emphasised by the main German funding institution for university research, the DFG, when they pointed out that third party project-funding can rarely be found which combines investigation duties with measures assuring adequate times for promotion. See: Wissenschaftsrat (2002)

bility of bursaries is thus, for the PhD community, a step backward considering the rights and favourable working conditions which they are enjoying now.[45]

Indeed, one could argue that the status given to PhD students is a kind of indicator, showing the value universities give to their PhD students either as 'productive' researchers at an early stage of their career or as students, simple consumers of knowledge in need of education rather than encouragement to innovate.

Apart from a few countries like Finland, European PhD students often experience difficult situations in social and financial terms – with little infrastructural support -, a matter to be reconsidered if this group is to assure the future of research… Awareness of the problem is growing as shows the increasing number of documents recently produced about the situation of PhD candidates within the university system or within specific universities as such. In addition, over the last few years, doctoral candidates have started to unionise in almost all the countries under investigation – either through national or international associations. Finding a European answer to that malaise, however, will not prove easy considering the mentioned diversity of regulations organising the life and work of PhD students; even the harmonisation initiated in the European Higher Education and Research Area deals with study

[45] For a written contribution on these questions see the VSNU-Position paper on the renewal of the Dutch promotion scheme: VSNU (2004): *Hora Est!* Reforming the research training system. [online at: http://www.vsnu.nl/web/p?DOWNLOAD.position_paper_hora_est_reforming_the_research_training_system&id=55203] and the corresponding reaction of the PhD students network (in Dutch): PNN (2004): Reactie op de VSNU-notitie '*Hora est!* Vernieuwing in het Nederlandse Promotiestelsel' [online at: http://www.hetpnn.nl/site/goodies/beleid/PNN%20-%20reactie%20Hora%20Est.pdf]

structures mainly and does not affect very much the PhD students' status.

The issue has been addressed explicitly at the 2003 Ministerial Conference in Berlin, where the Ministers proposed to upgrade the Bologna process to a three-tier study architecture – with transparent and comparable doctoral degrees; the importance of doctoral studies was then underlined as an integral part of the European Higher Education Area that could help develop the European Research Area and the European knowledge society and economy. Yet the only tangible outcome from Berlin was the formulation of the need for Europe of a more structured PhD education expressed in terms of programme-oriented doctoral studies.[46] It would be a mistake, however, to assume that universities unanimously wish to develop clearer European regulation and standardisation for PhD education: some, indeed, reiterate their reticence to standardise systems differently shaped by history – at the risk of losing their distinctive features. It is to be noted that, while insisting on diversity, many recognise, however, that some minimum common standards for PhD studies could be useful.

Following on the argumentation put forward in Berlin in 2003, the issue of doctoral education was also a key area of interest at the 2005 Ministers' meeting in Bergen[47]. For example, in their Policy Statement for the Bergen conference, Education International (that represents ETUCE teachers' unions), calls for the recognition of the doctorate as the first stage of academic and

[46] See: Follow-up Group of the Bologna-Process (2003), Reichert/Tauch (2003) as well as the Bologna-Berlin-Conference 2003 Website: http://www.bologna-berlin2003.de/

[47] For further information see the Bologna-Bergen-Conference 2005 Website: http://www.bologna-bergen2005.no/

of research-based professional careers; this should entail normal employment and related pay rather than 'atypical contracts' exploiting PhD candidates or their work potential.[48]

At institutional level, while the crucial role played by PhD candidates in the production of knowledge is usually recognised, such recognition remains on the rhetoric level according to many doctoral students. They point not only to the rather marginal positions they hold in the structures that shape the university system but also to the tensions between their own learning development and their training of younger students, between their large work assignments and their relatively low financial compensation – not to speak of rather insecure career perspectives. The institution is slow to recognise, unfortunately, the impact these contradictions have on university life but, depending on their disciplinary background, one thing is sure: young scholars in a doctoral setting cannot really give full attention to their own PhD research since they are usually attached to university projects that dictate the workflow, the questions to investigate or the ways to achieve results. As contributors to a collective enterprise, students can even be led not to follow personal research intuitions – thus running the risk to base their own work on external views of science, more general and less precise.

Working conditions – and their assessment – vary considerably from discipline to discipline. While in the natural sciences there is a long tradition of PhD students working in areas that correspond to their institute's main centres of interest or, at least, to the research work done by their supervisor, the situation in

[48] see: www.bologna-bergen2005.no/Docs/03-Pos_pap-05/050212_Pan-European_Struture.pdf

the social sciences and the humanities differs considerably. In these fields, the selection of a topic both original and personal is still often regarded as essential to the quality of the PhD, thus making teamwork and collective authorship rather marginal developments in research work. This means that – when they contribute to a common project – such students usually do their PhD work in parallel with a paid job: this causes enormous delays and can explain the high dropout rate in these areas.

Being part of a research project should indeed be valued as an advantage since it confronts young researchers early with the realities of contemporary research: work under external constraints, time pressure and the need to develop skills to find one's place in a team. Moreover, doctoral candidates attached to specific programmes must also learn to cope with multiple allegiances, to their supervisor, department or project leader.

A third important question comes up when the PhD period is seen as the key to *academic socialisation*, i.e., to the acceptance of university values. In an academic world which is less and less organised along disciplinary lines, where institutional boundaries are constantly trespassed, and where time and financial constraints play a growing part, what does such a socialisation process mean? From the interviews and the material studied, three perspectives seem central for any further discussion – or reform – of the university world (not to mention the scientific system as a whole). The first one concerns the cooperation between universities and industry and the fact that PhD theses are increasingly produced at this interface.

In the recent past, the idea of innovation partnerships between industry and universities that lead to

close cooperation at educational level (universities and industry selecting, for example, investigation topics that are researched in industrial labs, a rather frequent case in technical universities), that idea has acquired great importance. Even special programmes with public funding encourage such interactions and policy-makers highly approve of researchers entering collaborations of that kind. Such an interface is not without problems, however, especially when PhD candidates feel that there exist pressures from the industrial partner to achieve expected results. If pushed too early into this hybrid space - without having had the chance to 'grow up' in a stable and clearly structured research academic environment – doctoral students could face difficulties. Little research has been done on this issue apart from rather dispersed small-scale case studies. A deeper knowledge of research realities at this interface, as concerns PhD students, would be crucial to sustain the universities' future development or their links to industry.

The problems met by PhD candidates working from within industry can best be illustrated by US examples since university/industry research collaborations have started in America much earlier than in most European countries. Interestingly enough, the ideal division between basic and applied research, although considered to be dying out, is still very present today in the discourse of faculty members who often worry about the fact that students are being torn between two different logics – academic and industrial. So much so that they wonder if PhD education (as an important moment of socialisation) should not take place in a purely academic environment before graduates enter cooperative research activities.[49] American authors

[49] see: Slaugther et al. (2002)

warn that 'national policy has shifted from a welfare-warfare state that insulated university from market demands to a neo-liberal state that promotes the universities' interactions with the market. In the learner-graduate education system being constructed, the graduate student is the professor's gift to industry, the symbolic token that demonstrates trust between partners in a new alliance.' (Slaughter et al. 2002:308). They underline also the fact that through this experience of line crossing, academic culture perception can only change in fundamental and irreversible ways.

While trans-disciplinarity is in growing favour, since it is supposed to assure the innovation and scientific development of the future, interdisciplinary environments – it is interesting to note - are not considered ideal for the socialising of young researchers! In the Dutch context, for example, interviews showed clearly that students should first be educated in disciplinary contexts, as the grounding in one area is thought to be the most adequate way to ensure the transmission of basic common values and traditions in the production of knowledge. Notions of quality, methods and work practices appear better cut in specific scientific fields even if, simultaneously, early contacts with wider potential work environments are important in order to bridge the gaps separating diverging images, the industry perceiving universities as remote from any societal and economic reality while the university sees industries as money-making entities only interested in maximising their profits.

To use the expression coined in 1957 by Merton, PhD education aims at acquiring, 'the values and attitudes, the interests, skills, and knowledge, in short the culture, current in the groups of which they are, or seek to become a member.' (Merton et al. 1957:287) While this sounds evident (and many social scientists

have proved the importance of this process), changes in the current university environment deserve closer reflection. When PhD candidates move more than ever before between universities and other settings of knowledge applications, between disciplines and transversal environments of varied specialisations, then the socialisation process tends to get blurred, science and work values becoming less strict, negotiable if not contradictory - thus making it difficult to maintain that a doctoral education actually assures a common ground for a good start in professional life.

To succeed, the socialisation process also requires a well functioning learning and supervision structure, a key problem for contemporary universities if one considers the dropout statistics. For example, in the French university system, the most recent figures number some 64,000 PhD candidates – but 40% of them are expected never to finish. In this case too, the divide between scientific fields is very visible: thus, in experimental sciences, the drop out rate should be restricted to 15% whereas, in the humanities, the figure is supposed to rise to 64%. As suggested above, the reason for such an imbalance might lie in the fact that a PhD thesis in natural science is often part of a bigger project, developed in an integrated and monitored way (PhD candidates holding often a work contract), whereas, in social sciences and the humanities, students get fewer grants to support their studies[50] and are often supposed to work on their own – with no support structure which they could rely on to pursue a struggling search. Other countries show similar correlations, Germany for instance, where a high percentage of PhD students in natural sci-

[50] see: answers to the questionnaire prepared by the French delegates for Eurodoc 2004 [online at: http://www.eurodoc.net/questionnaires/France.pdf]

ences are linked through a working contract to the institution where they prepare a doctoral thesis; similar arrangements may exist in languages or cultural sciences, but for 20% of the candidates only.[51] These structures – or lack of them – correlate rather well with graphs showing the time used to complete a PhD thesis: the medical and natural sciences are most efficient indeed. Thus, the integration into wider research processes seems clearly to have a positive impact on the time spent until graduation, although other factors could be taken into account, like the commonality of topics and methods or, on contrary, the diversity of researched issues.[52]

The Dutch study *Nourish Talent!*[53] underlined, and very convincingly so, that, by focusing the quality control of PhD work on its output only, process control and coaching tend to be neglected. As a result, the key for improvement consists in a better integration of students that would take better account of actual doctoral routines. To mention Germany again, supervision is identified indeed as a central issue for quality – as confirmed by written documents and interviews. The lack of institutional supervision – combined with the fact of students who depend directly on their supervisors – leads to different forms of exploitation that are also restricting learning possibilities. The DFG, the biggest German funding agency, in its *Recommendation on Professional Self Regulation in Science*[54] expressed

[51] see: Röbbecke/Simon (2001)

[52] The UK description delivers a very similar picture. See: Bartelse et al. (2000)

[53] see: Meijer (2002). For the full version of the report (in Dutch) see: www.hetpnn.nl/site/goodies/beleid/BehoudTalent.pdf

[54] see: Deutsche Forschungsgemeinschaft (DFG) (1998). For an English version of the recommendations see: www.dfg.de/aktuelles_presse/reden_stellungnahmen/download/self_regulation_98.pdf

explicit concern about the monitoring of young scholars. The organisation suggested that supervision in groups of doctoral candidates could decrease dependencies, and it also underlined the importance of locally available mentors able to offer regular contact to the students; as a consequence, the DFG stressed the responsibility of the university leadership and emphasised the central role played by high quality internal communication structures. This recommendation was formulated in 1998 and its application in research institutions has now become a criterion for the reception of DFG funds. What is more, the DFG insisted on the potential of structured collective training through the creation of research training groups (the so-called *Graduiertenkollege*). Thus PhD students are invited to create their own peer networks by joining early and actively in the building of the scientific community.

Other countries, like Austria, have no PhD programmes at all. Preparing for a PhD is formulated as a simple right for the students holding a Master's degree to pursue their training – no consideration being made of the availability of a body of supervisors able to support the enrolled doctoral students. Since such candidates are usually not required to take up special course work, a high number of Austrian PhD students just 'disappear' without the university knowing why, when and how they gave up doctoral ambitions. The problem being now recognised, a growing number of measures are being taken to structure PhD education, like the initiatives to fund 'Doc-Teams' (Teams of PhD students who want to do their thesis around a commonly chosen focus) or to develop research training groups - like in Germany.

Better structures, such as 'graduate schools' and 'research training groups', appear to be promising solutions although they require both flexibility in their set-

ting up and solidity in their support of the students. Sometimes e-learning is presented as a panacea for the creation of virtual PhD networks. E-learning can certainly add facets to higher education and help restructure teaching, but it is often overlooked, should the e-learning-agenda be taken seriously, that the efforts asked from teachers and supervisors could be as great or greater than in traditional support activities – since a self-sustained e-learning environment has be set up and regularly updated, while direct contact between teachers and learners is still needed to assess the implicit learning acquired by autonomous students. As a consequence, and not very surprisingly, initiative is left in most countries under investigation to individual academic teaching staff when it comes to concrete e-learning projects. The same reliance on individual enthusiasts can be observed for the launch of team-learning and interdisciplinary learning models.

This brings us to our last question: next to the explicit and implicit rules of their scientific community – its culture –, what should a PhD candidate learn? What are the essential skills he or she should possess after having earned this additional qualification? Competencies like communication capacity and the ability to work in teams are often mentioned: attention should be drawn to another three aspects of the matter.

To start with, a central argument has been developed by Yehuda Elkana in a convincing address he delivered in 2004 at the EUA-Conference on 'Research Training as a Key to a Europe of Knowledge'[55]: the importance for doctoral students to develop the ***capacity of problem choice and solution***. He argued that belonging to a knowledge society and economy

[55] see: Elkana (2004)

demands an ability to find, select and define problems of interest that can also be solved in a reasonable timeframe. Moreover, one should be ready to identify the diverse types of knowledge and experience – often on interfaces of learning – that could produce potentially valid answers. Innovation indeed takes place at the borders of classical scientific disciplines and thus students, even when they refer to a specific disciplinary environment, should learn to appreciate other forms of problem solving in order to integrate them into their own process of investigation and development. This does also mean – following the argument of Nowotny and others – that innovation may take robust social forms only when different kinds of know-how and values are integrated in the research process, right from the start.[56]

In that sense, it would also be important for students to develop the ***capacity to walk their own line***, balancing their own personal skills with their contribution to more collective endeavours. This means finding an equilibrium between 'their' own time (as taken to develop high quality knowledge) and the overall time economy that structures research as a field of intellectual quest. Doctoral students thus need not only to learn how to make a realistic evaluation of the time needed to reach their objectives, but also to understand the time constraints applying to the environments in which their knowledge is or will be embedded. On that dual basis they can then develop individual action profiles and create their research niche, while also strengthening their capacity to integrate teams contributing to the success of their work. In other words, PhD students should be able to act as a driving force for research while contributing simultaneously to the

[56] see: Nowotny et al. (2001)

support of collective endeavours. This also means in their approach a capacity to walk the line between depth and breadth, or between disciplinary reasoning and interdisciplinary openings.

Given the fact that knowledge always finds value in specific contexts while the responsibility for its exploration is bound to science autonomy, doctoral students would also need to develop the ***capacity to reflect upon the questions they raise, the types of knowledge they produce and increasingly also on the impact their knowledge might have on society***. This is a key competence for a world in which science and society have grown so close together that the impact of techno-scientific knowledge on development is becoming evident at any moment of private and work life. In that sense, university staff, together with the students, should develop the capacity to criticise scientific changes and the premises on which they stand. PhD education represents indeed a crucial moment in which a critical distance to one's own work can be practised. As scientific research is as much about consensus as it is about the culture of contradiction and positive conflict, it is essential to create in tight schedules the moments when chosen research directions can be revisited, when doubt is given space, when critical appraisal is made possible. Similar observations would hold also true for the positioning of science in a larger societal context or for the communication of scientific needs to wider audiences. In this context, the focus should not be so much on instigating admiration or reinforcing the authority of science, but on building the ground for a sustained relationship of mutual trust between the scientists and the citizens. This needs open forms of communication, rather different from what is usually seen as typical public relations structures in academia.

5. The 'higher education profession': lost between 'job' descriptions, institutional expectations and self-understanding?

The current process of reshaping the higher education profession and the consequences this has for university development, both in research and teaching, make the core of this chapter.

When young people propose to enter a scientific career, the image of the profession certainly plays a part in their final decision. Has this image deteriorated since the number of young people who have ambitioned over the last few years to begin university studies in areas related to natural sciences has slightly declined or is stagnating, at the risk of jeopardising the development of these fields, or so it is feared? Exploring the question of the image of the profession therefore seems important.

Thanks to recent reforms, the higher education profession has been 're-invented' in many ways. Indeed, while retaining some of their old features, present university careers differ considerably from the past. It is thus challenging to identify the major changes affecting the profession and to see how each institution is organising to integrate such developments. Of course, the image of the (ideal) academic reflects not only shifts in the relations of research and teaching, but also the differentiation proposed between staff categories by universities interested in reformulating human resources policies supposed to help re-organise the research/teaching nexus.

One of the core elements of academic self-understanding - in particular in universities - was and still remains 'academic freedom'. Although the notion has always been limited by its context, it retains importance as a basic general reference. In some cases, like

in Germany or Austria, academic freedom is indeed enshrined in the national constitution. Despite this high level recognition, a gradual shift has occurred in the understanding of the idea, moving away from a rather idealistic to a more pragmatic vision of research freedom, now thought to result from multiple dependencies that counterbalance each other, thus giving some elbow room allowing to navigate between pressures exerted by different actors. This fact, however, is rarely spelt out so explicitly, and academic freedom remains a flag academics wave in their front when wanting to strengthen frontiers against unwanted external forces.

In this context, it is worth quoting the recent recommendation from the European Commission that deals with the *European Charter for Researchers* and the *Code of Conduct for the Recruitment of Researchers*[57]; it reads in its first Annex: 'Researchers should focus their research for the good of mankind and for expanding the frontiers of scientific knowledge, while enjoying the freedom of thought and expression, and the freedom to identify methods by which problems are solved, according to recognised ethical principles and practices.

Researchers should, however, recognise the limitations to this freedom that could arise as a result of particular research circumstances (including supervision, guidance and management) or operational constraints, e.g. for budgetary or infrastructural reasons or, especially in the industrial sector, for reasons of intellectual property protection. Such limitations should not, however, contravene recognised ethical principles and practices, to which researchers have to adhere.' (Commission of the European Communities, 2005)

[57] see: Commission of the European Communities (2005)

What is interesting about this statement is not its content – that corresponds to the reality experienced by most researchers in their usual environment – but the fact that it is one of the rare policy documents that clearly spells out the situations justifying restrictions to the freedom of research. Next to the evident constraints linked to budget and infrastructure, the text mentions also supervision, guidance or management, thus reflecting settings that could in a legitimate way interfere with the freedom of research. The statement immediately adds that such constraints should not contravene with ethical principles and practices, but it does not indicate who has the power to define this area of academic ruling. Moreover, the document remains open on how far the management could intervene in a 'legitimate and ethically acceptable' way in the process of scientific research apart from budgetary or infrastructural reasons. In other words, after finding its way to officialdom through insertion in the annexe of an EU policy document, this short statement opens up completely new perspectives on the degree of freedom individuals should enjoy in scientific institutions or, said differently, on how far institutions' interests could influence the research (and teaching) of their members.

The second important issue that needs closer consideration is the way research and teaching are intertwined. Some two years ago, the *Education Guardian* published an article under the title 'Divided we fail'[58] that addressed this issue) as it affects the staff working in universities. The paper dealt with the question of whether or not the unity of research and teaching should be realised in each university member or at institutional level only, through the co-existence of these two activities in one overarching setting, thus

[58] see: Floud (2002)

providing conditions adequate enough to assure high quality education and training. This example proves that over the last few years the taboo of an organic connection between these two types of activities, the so-called Humboldtian paradigm, has been questioned. In the British context this is no pure 'philosophical' debate, since the matter is deeply rooted in the funding mechanisms used for the universities – that receive separate allocations for teaching and research. Through the introduction of research assessment exercises (RAE) as well as through the promotion procedures applied to academic staff, the role of research has been indeed emphasised compared to the merits accumulated in the area of teaching. Now that the focus on excellence in research seems to have born fruit and led to improved quality in research, the idea is to push the development one step further by asking whether excellent researchers should not be given the possibility to opt out of teaching duties in order to dedicate themselves to research exclusively. Although the article mentioned above clearly pleads for combining the two functions in one and the same person, the question of role differentiation seems there to stay on the agenda of policy makers and university leaders.

In fact this debate has to be understood against the background of the diversification – and coexistence within one institution – of various contractual formats for employment in research or teaching. Important differences exist already between staff financed through third party money (supposed to carry out a specific project with little or no teaching attached), university staff responsible for varying amounts of teaching duties, and researchers paid by other public institutions (like the CNRS in France), i.e., people who work in a university framework, however with no contractual obligations next to research. Tensions might arise

because different understandings of academia are expressed through these several forms of employment, the coexistence or collision of which have been mentioned sometimes in the universities under investigation. Yet these tensions rarely develop into an open crisis unless the student/teacher ratios get too high.

A third element (that needs to be discussed) is the changing expectations in terms of staff capabilities and capacities at a time when universities are asked to develop closer interactions with the 'outside world' (even if this means industry only) and to find financial support for research activities. Thus, new and crucial assets for the academic profession can be entrepreneurship, management capacities and an ability to transform innovative ideas into attractive 'products' (in particular in the shape of research proposals). While policy makers underline the importance of these skills in the making of a successful researcher, there still remains in academia some ambivalence about such changes. For instance, in the frenetic way in which Albert Einstein is celebrated in 2005, the year of physics, traces of nostalgia can indeed be found. If many policy makers are using the name of Einstein as a PR gimmick to reinforce their own science ideology and innovation strategies, some researchers also use these commemorations to point out that in today's science system there would be hardly any place left for a personality like his: he would not be thought of as a promising young talent in a world where any investigation needs to be anchored in a clearly defined research focus, or in science communities where risk taking is kept low and where even basic research is supposed to spell promises for innovations said to be 'just around the corner'.[59]

[59] see: Felt (2005c)

Fourthly, university members are requested to 'meet society' in several new ways. What northern European countries label 'a third mission' next to research and teaching now covers outreach activities that have turned into an integral part of university staff duties.[60] This social demand is not formulated in the same way in different European countries. When required to justify their investigation projects, university members are often torn apart between a vision of research seen as a legitimate cultural activity (that should not need arguments of usefulness to stand out), and the hope for profitable innovations (that are often so amplified by the media that public trust could be lost when expectations of success cannot be met).

A fifth issue worth mentioning is the lack of clear career perspectives, a phenomenon now expanding to most countries under investigation. As a result, university staff is now expected to move in and out of academia, thus becoming mobile not only between institutions and countries but also between sectors of activities. Several policy documents have recently highlighted the added value of exchanges between academic and industrial research centres. Anyway, as mentioned earlier, the working contracts for younger researchers are now more and more short-term and precarious, thus forcing the next generation of scientists to develop patched careers. For instance, in Germany, from 1993 to 2000, with differences according to disciplines, the number of young researchers working on project mandates grew by 17% in the natural sciences and mathematics and by 45% in the languages and cultural sciences (when counted in full time equivalents). However, when taking a closer look at these 'encouraging' fig-

[60] see: Clark (1998), Etzkowitz et al. (1998), Krücken (2003), Slaughter/Leslie (1997)

ures, one discovers that part-time positions have risen tremendously – by 21% in the natural sciences and mathematics and by 114% (!) in the social sciences, economics and law. This means that, in the 'soft sciences' especially, the number of precarious work positions have risen dramatically, a trend reinforced by the growing importance of third party financing for university research as compared with general basic funding.[61] What is more, in some countries like Germany and Austria, law determines the time limits to employment that research contracts should apply. It is argued that such a measure protects young researchers by permitting the creation of a second tier of fixed and better positions to be entered after a couple of trial years; with the growing financing of universities through outside sources, however, it is often overlooked that short-term precarious positions could become the rule in the system as a whole since highly qualified people will not necessarily find fixed positions as long as public funding – which is less linked to circumstances than private monies – remains so low that it cannot even ensure permanence in basic research structures.

To sum up, the higher education profession is being reshaped in important ways. Positions in contemporary universities increasingly tend to require well defined work profiles that call for precise 'job descriptions', thus channelling university expectations as to the acquisition of external funds and the management of one's own immediate work environment – career aspects that have little in common with the more romantic vision of the university teacher who can follow his or her sense of discovery in rather quiet surroundings. This means that the Humboldtian ideal of learning through partic-

[61] see: Wissenschaftsrat (2002): 115 ff, own computations

ipation in research work – i.e., of close relations between teaching and learning - has given way to more pragmatic approaches that link teaching and research to time opportunities and cost efficiency. Institutional goals and ambitions have started to invade the space of autonomy traditionally reserved to individual researchers – a fact assessed as legitimate in the quotation of the European Commission's document mentioned above. Thus, the power for self-initiatives has been downsized to account for an institutional autonomy that clearly overrules personal aspirations and individual self-understanding. Although predictions about future developments in this field are difficult, one wonders if this new balance of responsibilities does not explain, in part at least, the growing disaffection of the younger generation vis-à-vis academic professions that become less attractive in many areas, other careers proving more tempting for a profitable future.

6. Science as practice and culture: why is there so much need to discuss 'good scientific practice'?[62]

It seems a tradition for universities and their staff *not* to reflect much on the nature of their academic practice or the changes it might be undergoing. Indeed, the discussion on the socialisation of doctoral candidates[63]

[62] Parts of this chapter are built on research done on the major fraud case of J.H. Schön. I would like to thank all those who have shared their ideas with me during the presentation of different aspects of this case and gave me advice. See Ulrike Felt (2005): *Fraud@science.org: Science, Fraud and Contemporary Boundary Conditions of Knowledge Production,* lecture presented at the Bar-Hillel Colloquium, Cohn Institute for the History and Philosophy of Science and Ideas, Tel Aviv University. For short articles on this issue see: Felt (2005a, 2005b)

[63] see, section 4 above

showed the central part played by that process both in giving access to the scientific culture or its accepted practices, and in provoking the weaknesses that fragment PhD education. It is only in recent times that due recognition has been given to the changes occurring in the universities and their social environment when they are inducing some new norms in research work - a dynamic world indeed shaped by contradictory forces. Thus, discussing the research-teaching nexus implies examining the issue of '**good scientific practice**', dwelling on the way it is defined and handed over to the next generation, or giving attention to how universities deal with the transgression of its norms. In a research and teaching environment increasingly characterised by competitive pressures and unstable work situations, by strict time schedules or by the constant quest for new research funds, the upkeep of high scientific standards for knowledge production and their transmission to the next generation have certainly become hot issues.

The recent cases of scientific misconduct that shook universities and other research institutions have involved well-established researchers as well as junior scientists. They opened Pandora's box by questioning the changing boundary conditions affecting research in general and the universities in particular – as experienced in the researchers' and teachers' daily routines. What is the impact on research practice and knowledge production of the hybrid context in which university research is increasingly taking place, an environment that mixes basic research, application oriented work and business type activities? How can value systems be transmitted to the younger generation in a mass university?

Although these questions seem pressing and obvious, universities as institutions – or their leaders - seem

more inclined to avoid their discussion than to debate them openly, at least as long as no problem appears. Addressing academic misbehaviour too squarely, by creating a feeling of uneasiness if not of suspicion, is often perceived as a threat to the authority and credibility of university work. However, when looking at websites presenting universities and research institutions, probity and integrity are more and more frequently addressed through documents proposing rules of conduct in research or through debates on ethical behaviour in science. When emerge possible temptations to break the implicit rules of academia, institutions seem to react in a rather pragmatic and partly technocratic way: the definition of a set of formal rules that are proclaimed more or less widely. Little effort is made to broaden the discussion or to develop in depth analyses – such initiatives that would seem to represent straightforward answers to a complex problem.

Indeed, the issue is multi-layered. For one, many of the norms of good scientific practice - that have been developed over a long period - have remained soft and implicit. As said in an earlier section, those values are handed over through the collaborative work environment in which students and young researchers are embedded: they should learn about them by seeing others follow them. For two, the changing conditions of research and the many collaborations that cross over disciplinary and institutional frontiers have blurred the value settings that define various fields, thus rendering rather difficult the tacit norm acquisition mentioned above. Therefore, explicit regulations about research practice do seem to be the answer. For three, the description of the handling of such issues in national surroundings and different institutional levels – and their comparison – is becoming a challenge not easy to meet. However, for four, the transgression of seeming-

ly accepted boundaries might change the inner and outer perception of academic work, and influence the trust needed for knowledge development between academic actors, between the universities as institutions or between universities and their partners in society. In other words, the way the higher education profession is perceived – within the academic community and outside – really deserves closer consideration.

To start with: **what can be learned from cases of malpractice in today's science system?** In answering this question, it is not the fraud or the corruption cases as such that are of interest (since dealing with individual cases would focus the discussion on personal deontology) but rather their use as indicators of the changes affecting the research environment. All academics are confronted with transformed structures – be they young or well established researchers and teachers. Cases of fraud thus open the 'black box' of contemporary science and, for a short while, reveal the complex network of relations, values and power structures that are the texture of intellectual positioning in society. By analysing this area of complexity, universities can address the broader issues at stake.

The first perspective revealed by such cases points to the **new constellations in which knowledge is produced, validated and distributed.** Nowotny, Gibbons and others – in *The new production of knowledge* and *Re-thinking science*[64] – have offered dense descriptions of the changes influencing the science system: the multiplication of places where knowledge is produced; the trans-disciplinary and temporary co-operations around more problem-oriented issues; the central role played

[64] see: Gibbons et al. (1994), Nowotny et al. (2001)

by application expectations rather early in the research process; and the fact that 'external' values are increasingly present - in the evaluation of quality in particular. The basis and background of these changes is rooted in the massification of higher education, a phenomenon that started in the 1970s. Referring to these four elements of their analysis only, and linking them to observations taken from studies of fraud and corruption cases, leads to the following hypothesis: transformed boundary conditions of scientific knowledge production, validation and distribution, prepare the ground for new and rather complex cases of scientific fraud, transgressing seemingly long accepted norms. Such an argument counters the authors who consider that the current cases of fraud just continue phenomena that have existed throughout the history of science. If our proposal is right, there is a need for new ways of dealing with such developments.

Four remarks can support the above hypothesis. Firstly, the multiplication of places where knowledge is produced has brought along new forms of competition between different institutions in the science system - as well as their increasing hybridisation. This evolution has led to what Dorothy Nelkin[65] nicely calls 'selling science', now a central preoccupation also for the universities that offer products not only on 'real' markets (e.g. through patenting activities) but also on a 'symbolic' market, where is negotiated the societal value of scientific knowledge and of higher education. The trend toward hybridisation is also supported by analyses by Etzkowitz and Leydesdorff[66] who point to an increasing mix of the roles assigned to different players. Universities, for instance, enter the world of

[65] see: Nelkin (1987)
[66] For example see: Etzkowitz/Leydesdorff (2000)

patenting, create spin-off firms, raise their own money successfully, etc., while industry, a new player in the higher education sector, runs, supports or owns private universities – to give but two examples. That these changes also have an impact on scientific practice and culture is often deliberately silenced in order not to open Pandora's box.

Secondly, crossing over disciplinary and institutional boundaries in research is not only an enrichment and challenge, but also poses the problem of an absence of commonly accepted practices – not so much in defining great lines of research development but also in determining daily routines, i.e., the fine-grained work procedures that fix the limits of what is still acceptable and what is not. This refers to the pressures and implicit expectations put on scientists, pressures that lead to their conscious or unconscious shift away from the boundaries defining what is acceptable. This problem touches in particular 'early stage researchers' who start their career in an industrial environment and never get socialised in an academic context.[67] Indeed, the Finnish *Guidelines for the Prevention, Handling and Investigation of Misconduct and Fraud in Scientific Research*, that are probably dealing most openly with the problem, stress very clearly that already 'achieving uniform definitions (of what fraud is or is not, of what misconduct is or is not) proves problematic (…) the differences between various disciplines and between the interpretations of what constitutes good scientific practice making determination of general definitions difficult.'[68] Thus the problem is deeply rooted in 'local' (disciplinary, institutional) practices, which are not dealt with explicitly

[67] see: Washburn (2005)
[68] see: www.pro.tsv.fi/tenk/guidelines.htm

in a global research context and are left largely to implicit agreements.

Thirdly, the increasing shift in the discourse from a knowledge society to a knowledge economy[69] corresponds not only to new structures for the financing of science but also to different expectations from research. This can explain why the first sectors affected by cases of fraud were in the bio-medical field - and in the US. In the late 1980s, discussion on scientific misconduct started indeed in health and in America before expanding to other fields of scientific inquiry in the following years. The debate touched Europe with a delay of some five years, in fact in Denmark, the first country to establish a national committee on scientific dishonesty in 1992. In line with the US experience, this institution was set up by the Danish medical research council – before being expanded to other fields later.

The turn to the knowledge economy gives also growing importance to the *selling of scenarios for the future* that present the knowledge that needs to be developed as innovation. The price of knowledge is evaluated through imagined plausible roles in potential futures, thus making the boundaries between facts and wishful thinking somewhat blurred and easier to transgress. Detailed evidence on that topic is given in a rather broad study from the early 1990s that analyses developments in the field of high-temperature superconductivity after a spectacular but unexpected discovery made by two researchers at the IBM lab near Zurich[70]. It strikingly shows how strong (and ambiguous) the scientists felt about the need to consider the potential and future applications of their research. In fact, in major fraud cases, 'trading the future' plays a

[69] see section 2 above
[70] see: Nowotny/Felt (1997)

major role. The matter consisted in producing narratives that went along proposed innovations, grounded in realistic probabilities, thus giving legitimacy to the power of imagination setting up potential ventures that could be sold as a new horizon for great – though rather unrealistic – futures. In that sense, universities alongside with other research institutions have become central players in the drafting of scenarios for the society's potential futures. These future scenarios – that are both shaped by and shaping discussions in the public arena – by reiterating their goals also play a fundamental role in deciding where science should go, or how universities should define the profile of their activities. Whenever funds are needed, the question of the potential impact of the knowledge to be created gets high on the agenda, i.e., results have to be envisaged, argued and rendered plausible. In that context, the media come to play an important role, both as players and platforms of reiteration that help develop and distribute such scenarios widely. Media presence becoming a value proponent of science, arenas of discussions - otherwise not specially related – start developing closer ties under the influence of these 'outsiders' in science – an issue to be touched upon later.

Finally, the 'massification' of higher education, next to many other problems, has influenced the socialisation of young scientists in the specifics of a research culture, thus questioning the implicit values that are the very basis of a common understanding of knowledge production, and of their transmission – a matter discussed earlier at length.

A second perspective can be addressed, the **social practices in research**. Indeed, the procedures ensuring credibility and trust in the output of science can only be challenged in a science system that is built on the

mass production of data, papers and scientists. This 'mass production', as it affects young researchers, has already been discussed here from the point of view of the real challenge it represents for universities: how to supervise doctoral students in a satisfactory manner, how to teach them to handle the increasing pressures put on them, how to 'control' the standards and outcomes of their work were but a few questions raised in this context. Universities are also confronted with the mass production of papers and data, a phenomenon that now needs a closer look.

First observation: the communication of scientific results in certain 'hot' areas is increasingly conceived not as a simple exchange of new knowledge but as a strategic act balancing the amount of information needed to be credible among one's peers with the limits of information transfer that ensure a privileged position in the ownership of sensitive knowledge. While such strategies – under different guises - have always shaped science communication, the phenomenon seems to have grown over the recent past. As shown in cases of misconduct investigated, being unable to reproduce results published in highly renowned journals does not lead at first to challenging their validity. Indeed colleagues consider this as a strategy – and a legitimate one – to protect intellectual property and one's position within the field, thus making sure that all necessary benefits (e.g. patenting) can be drawn from innovative findings.

The second observation refers to what Latour and Woolgar[71], in their first study of scientific practice in laboratories, labelled 'cycles of credibility'. They argue that science works along 'an integrated model of the production of facts'[72] in which credit is not simply

[71] see: Latour/Woolgar (1986)
[72] ibid. p 184

linked to reward, but is based on complex trading procedures between different forms of capital such as data, machines, money, networks, diverse forms of recognition, rendered services, etc. Thus moving in the field of science depends very much on the ability of converting one type of capital into another, especially when a scientist needs one type of assets to make the next step in the academic field.[73] Even if this paper refers to the late 1970s, one can argue that the various kinds of capital now being traded have simply increased in number by adding, for instance, media presence, patents or industry connections, an issue already mentioned earlier.

Co-authorship seems to have become also a trading zone for scientific capital. In one of the biggest fraud cases in the early 21st century[74], none of the twenty co-authors had participated actively in the empirical research presented under their name or had analysed original data. One could legitimately ask the question of what co-authorship means in such a case… True, co-authorship has been an issue for a while, with senior scientists signing the papers of their doctoral students and other collaborators etc.[75] However, the central issue that remains unresolved here consists in the responsibility which the co-authors take vis-à-vis the results as well as the authority they lend to a scientific paper by using their names and institutional backgrounds.

Finally, the question of what is acceptable scientific practice – where it is defined and by whom? – has to be asked. Looking at fraud cases, one senses fine nuances

[73] ibid. p. 201
[74] see: Felt (2005a, 2005b)
[75] For example see the yearly reports of the Ombudsman of the DFG in Germany [online at: http://www.rrz.uni-hamburg.de/dfg_ombud/]

in the negotiability of 'acceptable practice'. In a case involving a young German material scientist, the university commission looking into his PhD work, for example, had spoken of '*handwerkliche Fehler*' (technical mistakes), but the author being 'just' a PhD student, these approximations were somehow acceptable. Nowhere was it said what this lack in following the rules of the art concretely meant, and no explicit reference was given to any guideline, although implicit agreement seemed to exist among the referees[76] of what right practice amounted to. A well-known German behavioural scientist, who 'improved' the presentation of his data to 'make it look more convincing' got away with a 'warning' from the most important German funding agency, the DFG. As a matter of fact, sharing Nowotny's and Gibbon's analysis, when new types of actors enter the field of knowledge production, this brings along different expectations, value systems and work procedures that 'hybridise' those pre-existing in the science system. How can the often-cited ideals of scientific work then remain untouched?

A third perspective on scientific misconduct points to the existing **reward systems and quality control mechanisms**. The following hypothesis can be proposed: the increased number of quantitative indicators in reward and quality control evokes the risk of turning this 'objective' logic into the basis for the dynamics of the science system. Over the past few years, universities seem to have clearly aligned their policies on this logic when young researchers, in particular, are requested to produce a considerable number of papers very early on in their project assignment – simply to

[76] For the report of the commission at the University of Konstanz see: http://www.uni-konstanz.de/struktur/schoen.html

remain in the system. While the debate over quantitative indicators (like publication and citation counts) is by no means new, more critical voices were heard after recent cases of scientific misconduct. They pointed that, over the past decades, there was a steady increase in the number of scientific 'output objects' being produced – be they papers, patents, etc. – thus bringing the classical structure of scientific publishing to its limit. As a result, the review system becomes much more a relevance and plausibility check than the ideal control system it is supposed to be!

This reminds of an earlier criticism of PhD supervision that is much more linked in the university system to a classical output control than to a process analysis; indeed, in the case of publications too, it is the output that counts rather than the way of getting there. This is linked to the lack of supervision, on the one hand, but also to the fact that students often do part of their PhD research outside of academia, for instance in the framework of university-industry co-operations. In such contexts, doctoral candidates run the danger of becoming what Sheila Slaughter and her co-authors nicely labelled 'tokens of exchange between academe and industry'[77] where PhD students live through rather different knowledge production experiences that make them more vulnerable to external pressures.

The focus on output control – the (promised) result does count – also brings along important changes in the evaluation and publication systems. In fact it has been underlined that the power the reviewers and editors of journals exert on science development has grown uselessly large. A detailed case study of fund allocation by a Swedish medical council has been published in *Nature* at the end of the 1990s and points to unfair

[77] see. Slaughter et al., 2002

operations by showing how deeply nepotism and sexism can work when funds get attributed.[78] It demonstrated quite convincingly the difficulty to evaluate quality and to trace the more implicit set of values and criteria that play a determining role in decision-making. Furthermore, as competition within the scientific communities rises with increased specialisation, the often-noticed double role of being a peer and a direct competitor of the person under review points to a clear limitation of the system. Cases of hidden conflicts of interest, stealing of ideas, downplaying of innovative results, delayed publication are but a few of the items on the list of aspects that could be considered. Once more, to quote the Finnish Guideline for research ethics: 'Competition for status and position in the scientific community has in some cases led to the use of dishonest means for gaining scientific prestige or other benefits.'[79] As a consequence, top research journals – in some of the recent fraud cases, *Science* and *Nature* – find themselves accused not only of being science gatekeepers who ensure high quality, but also of playing an increasing role as trend-setters, i.e., of turning into policy-makers who strongly shape the research agenda. They contribute largely indeed to the decisions about the most promising fields for the years to come, or about those that should be placed on the back burner. They make the winners but also designate the losers – a criticism that has been expressed repeatedly but which, so far, has not been debated openly in any serious way.

[78] see: Wenneras/Wold (1997)

[79] see: National Advisory Board on Research Ethics: Guidelines for the Prevention, Handling and Investigation of Misconduct and Fraud in Scientific Research. [online at: http://www.pro.tsv.fi/tenk/guidelines.htm]

Moreover, many of the bigger fraud cases also clearly show the powerful role the media have come to play in science. They no longer represent the simple stage where science can outline its views; they have become full actors in formulating and reinforcing the public expectations concerning science. In a highly competitive world, increased visibility through reporting is more than often welcomed.

So far, reflection has remained at the level of the social organisation of science and much of the measures against scientific misconduct now being discussed do propose actions that stay at that level. However, not only the structures and players of the science system are undergoing change, but also the very way of producing knowledge seems to shift – a fact not to be overlooked. Indeed, many of the fields that have been tarnished by major cases of fraud show one common feature: they produce data in large quantities and/or are increasingly driven by new types of measurement technologies. As a matter of fact, the increasingly technology driven production of scientific data poses new challenges to the development, handling and control of information or of the results generated on that basis. The 'epistemic things' – a label borrowed from Hans-Jörg Rheinberger[80] –, which we create and handle in contemporary research, have undergone very fundamental changes. The mass production of large amounts of data in highly sophisticated technological settings (and in quantities unimaginable until recently), as is the case in many sectors of the biosciences, on the one hand makes our potential knowledge of the investigated 'things' seem more solid and better grounded, the body of data for the 'epistemic things' appearing more

[80] see: Rheinberger (1997)

tightly knit, and, on the other hand, contributes to a dissociation of the process of data-production from the interpretation of information, thus rendering the control of such processes nearly impossible. This might explain why it seems acceptable practice to co-author papers without participating in the production of data or at least observing part of its production – not to speak of consulting the raw material. These fraud cases thus strongly build on a new phenomenon that can be referred to as 'the fragmentation of the knowledge production chain'.

While data production procedures and the fragmentation of the knowledge production chain make things already difficult to follow, 'work-packaging' scientific knowledge production adds to the complexity of the picture. By using this term, stress is put on the fact that, increasingly, the production of scientific knowledge is characterised by cutting the knowledge to be developed into ever smaller packages – in quasi homeopathic doses – in order to keep financing bodies happy. The latter seem to believe that brevity expresses a solid planning capacity from the scientists they support and that short documents also represent, for them, an excellent control possibility. Such 'work-packaging' however goes far beyond a simple organisational effort from the researcher's point of view. At the epistemic level, it means putting a clear focus on those ideas that can be turned into 'output-entities' after a rather limited period of time. As a consequence, long term research projects with little or no arguable concrete impact beyond their inner interest for the sake of sheer science find it increasingly harder to be financed.

So far, attention has been drawn to the context in which scientific knowledge is produced and how shifting boundary conditions may facilitate if not encourage certain types of fraud. The question now is: How do

universities react to such cases? How are these cases handled in a fragile environment where different scientific fields compete to assure their own development? Indeed, judging from the debates about academic malpractice, avoidance strategies seem to prevail when institutions are first confronted with cases of fraud. It is only when the situation becomes too delicate (especially after media reporting) that policies for 'cleaning the house of science' are being adopted.

Such avoidance means shirking from making explicit the rules, rituals and limits of scientific knowledge production, i.e., the boundaries that shape teaching and research behaviour tacitly. As scientists would often stress: one can recognise what good science is without necessarily being able to give all the criteria that lead to such an assessment. Leaving certain elements in the realm of the implicit, however, gives also power to those empowered to decide over what is to be considered good science while leaving them a comfortable margin of interpretative flexibility as to what is good, acceptable or unacceptable scientific practice.

Once the case of fraud has been made public, the 'cleaning the house of science' process moves along four stages:

- The first step consists in singling out the guilty by limiting as much as possible the number of persons involved (ideally reduced to one person only)
- During the second stage the potential reasons for the individual(s)' improprieties are narrowed down to human failure and ascribed 'mainly' to some 'human or psychological problem';
- The third step tries to limit the consequences of the problem by underlining the exceptionality of the case, thus calming any rising worries about what this could mean for scientific knowledge production in general.

- The fourth level is an attempt to convince the public that, anyway, 'good science wins in the end', since frauds have been brought to light indeed and the 'sinner' has lost credibility. Must not science, after all, rely as an enterprise on trust relationships that consider scientists as people of exception, with moral standards higher than other members of society? This central myth of science makes science work.

Concretely, how do the science system and institutions like universities react – formally – to the increasing number of cases that have caused recently so much media-hype? Were counter-strategies developed? Scientific misconduct is a phenomenon difficult to grasp since most institutions try to solve the problem locally in order not to throw the case into the public arena. It is then dealt with as an institutional credibility problem; thus silencing it as far as possible seems to be the most appropriate mechanism of self-protection. However, coping with such deviations from commonly accepted norms evokes apparently different approaches in the countries under study. If in some, like Hungary, fraud is not an open and explicit issue within universities, in others, like Austria or Greece, the issue is addressed selectively in particularly sensitive disciplines, medicine for instance. In Italy, general scientific misconduct is not high on institutional agendas but issues of nepotism and corruption linked to academic promotion are dealt with extensively.[81]

In 1991, Finland was one of the first countries to set up a National Advisory Board on Research Ethics, explicitly to deal with all kinds of scientific misconduct. It was to help handling cases difficult to deal with

[81] see: Abbott (2001)

at local level and where an external viewpoint seemed essential. Yet, as stated in the board's report, most cases have remained at the local level and, as a consequence, there is little data available on the number of cases that have been researched or actually confirmed. To be noted that, since 2002, a task force has been set up to elaborate ethical guidelines for the humanities and social sciences in Finland.[82] Moreover, the National Advisory Board strongly recommends to integrate research ethics into the students' curriculum, thus creating early awareness of the problem and giving a general identity to specific cases when they arise. This represents an exceptionally proactive approach to the question of academic misconduct.

The case of the UK is also interesting since, like Finland and since the early 1990s too, Britain benefits from a most explicit and open tradition when dealing with the issue. Universities have not only rather extensive codes of practice but also detailed guidelines about how to deal with allegations of misconduct. In quite a number of universities newly appointed members receive the 'Code of Practice' of the institution and have to acknowledge receipt of the document. Some codes may go down to details such as 'pencils or other easily erasable materials must not be used' for the recording of primary experimental data – or they indicate very precisely how data should be filed and stored.[83]

Finally the history of how the German academic system has confronted major fraud cases over the past decades shows another interesting variation. In that country, the initiative came from the *Deutsche*

[82] see: National Advisory Board on Research Ethics (TENK) (2003)
[83] see: www.man.ac.uk/policies/17.htm

Forschungsgemeinschaft (DFG), when they noticed that researchers funded through their budget were faced by serious fraud allegations, thus questioning the adequacy of their own funding practice and of the quality control system within academia. A strong need was felt to restore public confidence in the integrity of German research. As a result, a code of conduct has been drafted - which the universities that apply for DFG research funding must subscribe to and integrate in institutional practice. Deep concern exists about the capacity of existing social structures to assure the control of science within a highly competitive milieu. Colleagues, indeed, could prefer not to interfere with the work of their peers, as this might, in the science system, make of them *personae non gratae*. That is perhaps why, over the last few years, many universities have set up their own procedures, created positions of ombudsmen or other structures in order to deal with allegations of scientific misconduct.

However, these structures have also brought to light the difficulties inherent to such situations. Indeed, judging from those countries where some figures are available, it appears that only a tiny minority of cases of alleged misconduct actually turn out to be real cases. From this perspective, the matter of malpractice has become even more sensitive since unfounded fraud allegations can do as much harm as scientific misconduct itself. Universities therefore would need to be more proactive, particularly in their direct environment, taking the issue of scientific culture and practice as a central topic calling for the redefinition of a realistic and common understanding of science taken as an enterprise. This could be a very fruitful basis for discussions, should contemporary universities assess the potential and limits of their research and teaching.

Challenges for tomorrow: some concluding reflections

Definite conclusions cannot give justice to the shifting situation described in this paper; however, some perspectives calling for further reflection can be outlined here - that may contribute to the discussion on the future development of universities.

What becomes obvious, when revisiting the different topics discussed in this study, is the fact that the societal functions expected from universities have expanded well beyond the institutions doing 'simply' good quality research and teaching. This is not only expressed in several EU strategic documents but also in policy and position papers originating from national institutions. For example, a paper by the Italian conference of rectors on *The State of Italian Universities*[84] underlines that universities do not only answer to society's needs by research and teaching, 'but also by contributing to the solution of fundamental problems concerning the quality of life, and by giving substance to a citizenship that is ethically based. (…) Thus universities must teach, they must help produce technologies and create professional figures that are of use to the country. They must not only make a contribution to analysing society in a critical way but also help solving its problems and improving its conditions.' Therefore the research-teaching nexus needs to be reconsidered in the framework of new and enlarged expectations. So far, university reforms in many countries seem to have applied what could be called a 'laboratory approach' to university transformation. Thus, different problem areas are being 'isolated' – to be treated independently. Such a reduction of complexity is cer-

[84] see: CRUI, Conference of Italian University Rectors (2004)

tainly an efficient way to obtain detailed knowledge about particular constellations of events and power; it allows for some separate solutions to cope with particular problems concerning the teaching sector, or various research, outreach and life-long learning activities. However, this very approach leads to rather fragmented prescriptions that are rarely integrated into a more complete and systematic analysis of the general situation and could frame strategies for the definition of appropriate solutions. As a result, contradictory rhetorical discourses are usually at work in universities, that point to divergent value systems sometimes coexisting and, in other circumstances, clashing with each other. If autonomy means speaking with one voice, the challenge for universities is to develop structures of compatibility that help develop a more integrative approach to problems, reference values being negotiated in order to build a common understanding of the institutional future. Such values can then be handed over more forcefully to the next generation of researchers.

This observation leads us to a second point of reflection: recent reform debates hint at the fact that 'the university' is both disintegrating and being reinvented – in terms of forms and structures. This is no physical process of disintegration heralding the end of the university, however, but much more the handling of a diversification of tasks, universities becoming increasingly tied to different types of partners through cooperative networks that address rather disparate types of 'clienteles', be it in research, teaching or other activities. As a consequence, universities have started to imagine specific micro-solutions to their individual set of problems. This does not mean that they do not refer to a common set of culturally rooted values or of shared problem solving strategies; neither does it imply

they do not share what was called the basic myths of the universities in our second report to the Magna Charta Observatory[85]. However, since autonomy is often articulated at institutional rather than at system level, universities tend to aim at flexible and context bound solutions, all the more so as they find themselves in a competitive environment. For policy makers, this implies that the use of best practice models to handle problems within universities has become somehow obsolete since they offer a general top down approach. Solutions should now be much more taken from a patchwork of different experiences, emerge from a bottom-up process, and demand much deeper self-questioning in the institution – that could lead to take unusual risks in terms of decisions.

While autonomy brings the flexibility needed to produce tailor-made solutions, it also has serious drawbacks. When the State kept a rather strong hand on universities, responses to a changing environment could be developed through relatively lengthy procedures. Many changes, indeed, often implied legal amendments that usually took considerable time to obtain, or they required political negotiations and were often accompanied by protests from those asked to adjust behaviour in order for the reform to be implemented. Thus, to urge universities to develop new responsiveness to societal needs, the State often found it easier to make them autonomous rather than to regulate their actions. Moreover, autonomy should allow academic institutions that are embedded in different environments and face diverse problems to react not only independently but also quite quickly to change. The risk then could be of 'over-adaptation' in institutions that were long considered to be rather inert -

[85] see: Felt/Glanz (2004)

once they take advantage of their newly gained adaptive flexibility; 'over-adaptation' indicates the unusual sensitivity to external change that has developed in some countries and institutions, reinforcing a constant flow of short-term adjustments that tend to blur the overall direction of the institution's development, thus making it hard to evaluate the full impact of the decisions taken.

The interviews, indeed, capture the feeling that the multiple reorientations of the university that took place in the recent past evoke among academics a real sense of ambivalence. On the teaching side, the dominant discourse emphasises that students should be educated to live up to the high expectations society puts in them. However, while they should be critical when contributing their knowledge to community development in a finely tuned approach of what is good and ethically acceptable research, the way they are taught science often tends to downplay or hide the nuances and difficulties linked to the production of knowledge. Research is then generally described as unproblematic – which *is* precisely the problem. As says Elkana: 'The problem lies exactly in the reasons why it looks so unproblematic. There is, in fact, far more fundamental controversy within the sciences than its practitioners are prepared to confront. This leads to a doctoral preparation of the next generation that leaves students and new PhD's living in a dream world of putative consensus and shared premises.' (Elkana 2004:3) Thus, teaching should address in a more adequate way the different facets of knowledge production, i.e., the contradictions that arise from its development and the choices needed to keep its integrity. In short: students have to understand science as a social enterprise that requires specific behaviour for which, in terms of action, clear responsibilities must be taken.

On the research side, similar ambiguities exist when research is supposed to open to societal questioning and to the participation of stakeholders from outside academia in order to facilitate innovation while, at the same time, the production of context-bound knowledge and know-how is being stressed as of central importance. Navigating the unknown, however, requires research actions and evaluation procedures others than those established so far – pragmatic and utilitarian. At moments defined by scarce financial resources and bulldozing time pressures, the decisions about which research to enter have become risky business.

Such ambivalences are well reflected in the discussions of the way science as a practice and work culture needs to be handled within scientific institutions. The growing awareness of scientific misconduct clearly indicates that new ways of transmitting research practices and scientific knowledge to the next generation must be found. To progress in this field, the only promising approach consists in disentangling prevailing scientific myths and innovation practices by determining their fluctuating limits and the grey zones of research that call for open discussion - thus can be assessed the strength of existing disagreements and of the struggle for finding the solutions that it all implies. So far, institutional answers have not been very innovative, mainly the writing of codes of conduct that members of universities are asked to endorse. A real debate and true exchange on such issues are far from developed in the university world.

Another red thread that runs through most of the changes observed in this study makes the time frames and timing of programmes and projects a central regulatory force in the life of universities. Temporal structures have always played an important role in academia; however, our hypothesis is that the phenomenon

has gained in prominence: age limits of all kinds now characterise career structures; research is hardly possible outside predetermined projects with clear time structures and deadlines; institutional evaluation procedures link duration to quality; university staff contracts are more and more limited to fixed periods; students using more time than foreseen to achieve results are perceived as a problem; the impact of basic research on innovation development should become tangible within a 'reasonable' time-span, … and the list could be prolonged. Thus tomorrow's universities will have to ensure the co-existence of different development speeds in various sectors, thereby encouraging asynchronous and contradictory phenomena that can only increase the feeling of time pressure that is noted everywhere in the accounts given of the changes affecting universities. In other words, to ensure autonomy, academic institutions need to set a 'time policy', thus allowing for long-term stability development.

The discussion above focuses on organisational and structural aspects of university identity… But what happens to the knowledge that is produced in those universities when re-arranged for the 21st century? Why should the epistemic core of the university remain unchanged when all other features of the institution undergo transformation? This interesting query is certainly disturbing as it opens areas of reflection rarely touched in interviews that dwelt preferably on more obvious changes in universities, i.e., organisational and structural transformations mainly, value modifications more rarely. Hardly any thought is ever given to the core question of the production of knowledge itself. This is an easily understandable taboo since questioning the impact of the conditions of its production on knowledge itself could indeed shake the foundations of a science based on the ideal of research impartiality and

of the researchers' selflessness. However, the request for more hybrid forms of knowledge production and for the stronger involvement of various types of stakeholders, including economic players, does contradict the ideal just mentioned since hybrid forms of knowledge production call for revisiting the traditional value system and work procedures in universities – questioning also their compatibility, should new purposes be achieved. Opening such a debate would lead back to the concept of 'knowledge ecology': has it not been the historic role of universities not only to produce new knowledge but also to safeguard it? Is it not the critical distance to societal demands that must be sustained in order to allow for the renewed capacity to 'invent' the societies of tomorrow? Universities are thus challenged, on the one hand, to develop an ability to react to the demands of society while being conscious of the consequences of such reactions, and, on the other hand, to set up explicit structures and procedures that counterbalance a 'tight time ideology' by creating space for the long-term development of the diverse forms of knowledge that transcend the need for immediate applicability. By bridging these tensions, universities can create a reservoir of knowledge also built on a scientific vitality that moves beyond direct causal connections or the necessity to prove the immediate usefulness of research. In a way, this study comforts the analogy for the academic world of precautionary principles used in other management areas, thus asking for the development of 'risk governance' in scientific institutions. This should entail the careful evaluation of the potential impact of university taken measures, the pursuit of an ideal of potential reversibility when introducing change and the development of a more global and multidimensional understanding of universities as institutions.

Once multiple reforms affect the university system, there remains, in the end, one question to be answered in *individual institutional settings*: what is so special about universities in a world where institutional boundaries get blurred, tasks multiplied and identities redefined?

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Engagement with the Community: a new basis for university autonomy in a knowledge society

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Abstract

A new social contract between society and the university is altering the notion of engagement from its traditional association with outreach to embrace the idea of in-reach, with consequences for the traditional conduct of both teaching and research. This paper focuses, in particular, on the changing nature of research practices implied by in-reach and argues that the challenge for universities is to develop the competencies required to become sites for the production of socially robust knowledge. Paradoxically, it is on this development that the future of institutional autonomy now rests. A new contract between society and universities is being drawn up to express the idea that autonomy can be sustained only to the extent that universities become engaged in the joint production of knowledge with their communities.

Prologue

I have been asked to elaborate on the theme of the multi-task university in the context of an emerging knowledge society and economy, while keeping in mind the central concern of the *Magna Charta*, i.e., to develop and strengthen the institutional autonomy of universities. Of course, universities have been for many years now multi-task organisations, delivering an increasingly diverse range of services that are traditionally categorised under the headings of teaching, research and out-reach. The question arises, then, "*Does the emergence of the knowledge economy, in particular, have implications for these activities?*" The answer is unquestionably, *yes* since the emergence of the knowledge economy is not an isolated development. Rather, it is emerging as *an element in a new context*. To the implications of this context universities are learning to adapt. Among such adaptations is the re-drafting of the social contract between universities and society, a contract that will embody a new meaning for their institutional autonomy. Let me elaborate.

The autonomy I will describe reflects, and is reflected in, the new context in which universities are having to operate. And it will turn out that, in this context, institutional autonomy is not so much a pre-condition for scientific and scholarly development, as is so often argued, rather than a consequence of the need, on the part of the university, to develop complex and intimate interactions with society. In the new context, as in the older ones, autonomy has to be earned, not only by individuals but by institutions as well.

The notion of *earned autonomy* is hardly a new idea: it has under-pinned the social contract between the university and society since at least Humboldtian

times, if not before. Under this arrangement, the universities were to pursue research and scholarship relatively unhindered in return for providing the education and training of successive generations of young people sufficient to provide for both the ongoing development of science and the requirements of the growing industrial labour force.

Let me offer three examples from the side of research of what is meant by earned autonomy, in three different environments. First, in research training, postgraduate students are hardly free to establish their own agendas; they must first demonstrate that they are competent to identify, develop and solve some problem, according to the canons of scientific inquiry that operate in their particular discipline. Only after, when competence has been demonstrated, are they then really in a position to strike out on their own and set their own research agenda. In this way, to the extent that they succeed in demonstrating creativity and competence, young researchers gradually acquire autonomy over the direction of their research.

Second, consider the inventor of the transistor, William Shockley. He made his discoveries while employed at Bell Labs in New Jersey. Many students of my generation went there to further their scientific careers after completing their PhDs. The brightest of them were able to join the Laboratory's science programme. Employees were permitted to stay with that programme for as long as they could demonstrate that they were able to contribute relatively quickly and continuously at the highest levels of scientific achievement. Not many had this ability but for those who did, autonomy followed, as it did in the case of Shockley. The continuing demonstration of the ability to perform at the highest levels allowed scientists in the science program to set their own research agendas within the con-

text of what was, do not forget, an industrial research laboratory.

Thirdly, consider the case of John Nash, mathematician and inventor of game theory, who studied at Princeton University. His biographer notes that: *"by his late twenties, Nash's insights and discoveries had won him recognition, respect and autonomy."* (S. Nasar, (2001)

These three cases illustrate the much more general rule that, in general, autonomy in research is earned. It is neither a right nor a precondition to doing good work. Rather, it is a reward for excellence achieved.

The new context

The new social contract is emerging but it will reflect a new context. What is that new context?

The main elements of the new context are:

– a *rightward shift in political thinking,*
– *globalisation,*
– *innovation and the knowledge economy.*

Let us take each in turn.

Rightward shift in political thinking

The shift in political thinking refers to the fact that in all jurisdictions across the world, universities must *learn to engage* with a new context. There are several elements to this but they all seem to be related to a profound shift in our political thinking. A case for this change has been cogently argued recently by the eminent political scientist, John Dunn (Dunn, 2000) who has observed that *"across the nations the balance of beliefs and sentiments of a given population, the institutional forms through which that population can act, and the cumulative consequences of the actions which*

members of those populations choose to perform, have all shifted in the direction of one particular kind of order - that is, to the values, institutions and modes of organisation of a ... [market-based] … political economy."

This complex of changes, which I will summarily refer to as the 'rightward' shift, is not primarily about which of the various models of capitalism – whether the Anglo-Saxon, the German, or the Japanese form – will come to dominate the global economy. Rather, it describes changes in the ways in which individuals seem to want to organise their lives and the institutions in which they choose to place their trust in order to achieve personal objectives.

The belief that the institutions of a liberal political economy – essentially those that promote markets – are now regarded as the ones most likely to provide the framework within which to make our life-choices constitutes a revision of our expectations concerning the ability of our public institutions to provide 'goods' we desire. How far this will go, and for how long this belief will be sustained, we cannot know but such a profound change is bound to touch universities. To the extent that universities are drawn into the rightward shift, they enter more intensely into competition with one another, not only nationally, but also internationally. In the new context, universities view one another with a wary eye, for they compete against each other for students, staff, and, increasingly, for resources of all different kinds.

The rightward shift is not a trivial development and it has little to do with the scare-mongering that would impute to that shift the desire to turn universities into businesses. It is not about that at all! It is about a profound shift in our belief and expectations about how our life chances can be met.

Globalisation

Globalisation is an admittedly ambiguous term. For our purposes, it can be viewed as the outcome of the processes of imitation, adaptation and diffusion of innovations - as they are taken up by one country, firm or university after the other. Here, innovations are 'solutions' to problems of many different kinds - whether they are new technologies, organisational forms, or modes of working. As innovations, these 'solutions' offer different ways of doing things and, as such, they can pose a threat to established routines.

The diffusion of innovations provokes a competitive response in so far as it induces other participants in the market to seek to protect themselves from a possible threat to their own position. Under the regime of globalisation, this threat can now arise anywhere in the world.

The Knowledge Economy

The sources of innovation, it appears, increasingly lie in knowledge and this belief underpins the assertion that we now live in a knowledge economy. But note that the vitality of the knowledge economy does not necessarily imply a simple dependence on the flow of scientific discoveries. Rather, it relies on the ingenuity with which individuals, groups and organisations are *able to integrate knowledge* that has been in all probability been generated by others. Unfortunately, this cannot be done unless potential innovators possess at least some formal training, particularly in the sciences.

That is why universities are so crucial to this type of economy. If it does nothing else, university education does generate in its graduates the ability to access knowledge produced by others. Whether they can then

do anything with this knowledge depends, in part, upon their creativity and, in part, on the resourcefulness of local institutions, governments, firms, industry associations, bank and venture capital providers, etc… what is today referred to as the national innovation system.

In sum, these elements - the rightward shift, globalisation and knowledge-based innovation - are linked and together constitute a new context in which many social institutions are immersed and with which they are trying to come to terms. Universities, in particular, are among the institutions affected by the new context. They, too, have been affected by the rightward shift in the political thinking and been drawn into competitive markets for higher education services - to which they are trying to respond by innovations of various sorts.

The new context promotes institutional change, i.e., some adjustment of formal rules as well as setting up incentive structures that, together, intend to alter social behaviour. Clearly, the new context implies that universities, too, need to behave differently. The new context provides the framework within which the prevailing social contract between societies and their universities is being re-drafted.

What is the prevailing social contract with universities?

In our day, the universities, along with other institutions of the industrial society, have the particular shape they have and are able to function as they do because of an underlying agreement between them and the rest of society. Social contracts also set up relations of trust that the agreement will be adhered to on both sides and survive only as long as that is so. In general, any society exhibits many different social contracts. For example, there are social contracts between society and gov-

ernment, between society and industry, as well as between society and science.

More specifically, the social contract between society and science, particularly university science, has been structured primarily in terms of a certain form of knowledge production (basic science), particular types education and training and, latterly, a range of outreach activities. Initially, in return for public funding, the science of the universities would diffuse new knowledge: through a flow of discoveries, techniques, and methods for society generally, they would train successive generations of scientists, most of whom would go out into the world of work, mainly in industry; they would also provide extension courses for adults who wished to continue with their education.

By contrast, industrial R&D was to provide for the 'appliance of science' and carry the knowledge of basic discoveries into product and process innovations on which economic growth was perceived to depend. Government science was meant to fill the gap between the public good of the university science and the private good of industry; that is, to carry out research in relation to principal functions of government, defence, public sector utilities, public health, safety standards, etc..

Thus, the social contract between society and science was supported by three major social institutions – government research establishments, industrial laboratories and the universities - between which there were relations of complementarity.

For a considerable time, these institutions remained relatively separate, each being associated with a specific facet or area of knowledge production. The idea that universities were separate, distinctive knowledge producing institutions underpins much of the current debate not only about autonomy but also about the university's engagement with society. Under the terms

of this contract, universities were expected to engage with society, but they did so rather at arm's length.

In research, for example, the current contract which enshrines an element of institutional autonomy for universities implies that research agendas will be set by university scientists even though the expectation is that the outputs of research will be communicated to the wider society, whether industry, the health sector or the social services. Under this aspect of the social contract, engagement with society is primarily about communicating the *results* of research to organisations *beyond* the university, though precisely how this is to happen was, until recently, left unspecified.

The direction of communication from universities to society is amply illustrated by the current increase in technology transfer activities. In these activities, communication is intended to flow *from* the university *to* the community. So far, at least, technology transfer has not reached into the universities' thinking deeply enough to modify their incentive structures very much. And maybe that is as it should be. To that extent, however, communication has been primarily one way – from universities to society; there has been little reverse impact on universities, their organisation or ethos. In the prevailing context of separate knowledge producing institutions, this is precisely what one would expect.

More generally, in their engagement with society, universities have struggled to preserve what they perceive as their autonomy in research matters against the *trespassing* of other groups and interests; thus autonomy becomes the absolute right to be able to pursue unfettered scientific inquiry.

Alas, it is precisely this trespassing of one set of institutions on the ground of another that characterises the new context as is evidenced in so many of the

social changes taking place in our society. '*Transgressivity*', then, is altering the fundamental terms of the prevailing social contract, and with it, the terms of engagement existing between universities and society. Let me illustrate this.

The beginnings of the dissolution of the prevailing contract

During the twilight of the Cold War, if not before, the relative institutional separation between society's major institutions had begun to breakdown, not least in the domain of research.

First, in government research, it happened when the system of government research establishments was privatised. Second, as governments gradually moved their priorities to the maintenance of international competitiveness, many long-established industries were also denationalised and, in many countries, firms which had been dependent upon government for R&D support were forced to make up for these resources internally. Third, in universities, too, the massification of higher education moved universities into a market place for students; in some cases like Australia, this was accompanied by the introduction of a thoroughgoing culture of public accountability and a mounting social demand for 'value for money', a request that soon moved from teaching into the heart of the research process itself. And, finally, the research councils themselves - created initially to support basic research in the universities - were transformed into instruments for attaining national economic and social priorities through the development of target programme and project funding. These trends are observable in virtually every country of the world, though the timing and rates of change have varied with historical circumstances.

The upshot of this decade's long series of changes is by now evident. The once clear lines of demarcation between government, industry and the universities, between university science and the technology of industry, between basic research, applied research and product development, between careers in academe and those in industry seem no longer to apply. Instead, there is movement across established categories, greater permeability of institutional boundaries, greater blurring of professional identities, greater diversity of career patterns.

As a result, science not only invades society through the flows of the discoveries it generates (the outcome of its one way communication with society, described above), but, itself, is now invaded also by countless demands from the side of society. This change has not been primarily the result of the policies of impecunious governments, or of greedy industrialist trying to take over the universities, or of a disgruntled citizenry disappointed by the performance of science, though some elements of each can be discerned in their histories.

Quite the contrary! It is because government decision-makers, industrial managers, and people in general understand very well the importance of science that they have responded to the growing complexity of the contemporary world by attempting to draw the research capabilities of universities into their interests and concerns. In this, at least to some extent, society has been successful. Witness the growth in the numbers of university scientists that now participate in more open and complex systems of knowledge production!

Society speaks back

It is because university research is perceived to be so successful that we see a growth in the demand for sci-

ence to participate in an increasing number of problem areas, many lying outside of the traditional disciplinary structures that govern research in universities. At the same time, because of the attraction of working on these complex problems, many university scientists are now drawn into the markets of the knowledge economy. As we have seen, such developments go hand-in-hand with the rightward shift, globalisation and innovation. Along with the new context, then, comes a different relationship between society and science.

To put the matter somewhat differently, whereas – under the prevailing social contract – science was expected to speak to society, now, in the new context of increasingly permeable institutions, society can, and does, 'speak back' to science.

However, while it is widely understood that when science speaks to society, society is likely to be changed, what is less often appreciated is that if society 'speaks back', this is also likely to transform science.

Reverse communication may be expected to affect scientific activities in many different ways. For example, over the past twenty years, the strategic policies of industry, government and the research councils have been increasingly driven by a variety of socio-economic priorities that demand the involvement of a more diverse range of research competences and exhibit many more cross-institutional links. One consequence of this has been to broaden the base of research funding from its previous wholesale dependence on government sources to a much more diverse range of sources. Another consequence has been to alter forms of organisation, division of labour and day-to-day practices within universities. This has shifted a model built around a single professor and her research team, composed mainly of postgraduate

and post-doctoral students, to that of participation in a variety of problem solving environments in which universities are only one player amongst many. As evidence, witness the growing numbers of staff in universities these days who are prepared to work on short-term research contracts for customers of very different sorts, the growth in the numbers of research institutes targeted at social objectives associated with universities and involving in various ways academic staff, the explosion of university-industry partnerships, or the participation of universities in defence-related research. All of this reflects a more differentiated, indeed increasingly differentiating, research environment.

As a consequence, university research is a more complex affair. It now tackles more interdisciplinary problems, it is funded from a variety of sources, and it exhibits more cross-institutional links. In a word, the university community is broadening the base of the kinds of problems that it considers worthwhile working on and, over time, this is bound to change academic research practices and methodologies, its modes of organisation, and its reward structures. This change is in part due to the fact that scientists are skilled enough 'to follow' the funding but it also reflects a changing perception amongst them that intellectually challenging problems can also occur outside the traditional disciplinary structure.

The point is that, when society 'speaks back', it does so, not deferentially, but by demanding innovation in a variety of ways – whether indirectly through the medium of government policies that insist on the involvement of users and beneficiaries in research projects, or more directly through the involvement of individuals, foundations and socially-concerned groups in the research process itself.

Socially robust knowledge

Scientific authority is now based less on the results achieved (these are recognised to be provisional) than on the methods that have been used to obtain them. This much, at least, is uncontested by most scientists. But if methods determine 'what works', 'what works' has itself moved on and has now acquired a further dimension that includes knowledge that seeks to be effective in a range of contexts and therefore could, in a sense, be described as knowledge that is valid 'outside the laboratory'. Through reverse communication, then, social demand enters the research process, influencing its problem formulation, implementation and evaluation phases.

To capture this shift, it may be useful, if a little provocative, to describe the impact of reverse communication in terms of a shift within the research process from the production of merely reliable knowledge (knowledge valid within certain carefully controlled laboratory conditions) to the production of socially robust knowledge (knowledge valid beyond the laboratory, i.e., 'robust' because it has been tested in a range of other contexts).

Similar methods and techniques will continue to be utilised but the sources of information are more diverse and the contexts in which they are applied more complex. Consider, for example, the case of Deep Vein Thrombosis (DVT), a condition that has been linked to the cramped conditions that passengers have to endure when they take long flights. DVT is a well-known medical condition. Many of its characteristics – for example its relation to the genetic make-up of individuals – have been investigated in laboratory-based research. Still, the link between the possible onset of DVT and changes in the nature of aircraft

travel apparently went undetected. In the early years of air travel, the question of whether air travel might induce DVT (or indeed other medical reactions) was investigated. But links with the onset of DVT were set aside because on the basis of the tests then carried out – that is, relatively short flights in airplanes travelling at 6000 feet and using mainly military personnel – no correlations emerged. Alas, passengers now fly at 35,000 feet for ten to fifteen hours at a time and, as a population, exhibit a great variety of medical histories. When tested in these circumstances, it now seems that human physiology can be adversely affected by flights under these conditions. One could say that the initial research produced reliable knowledge – reliable in the context in which the tests were carried out: there were no symptoms of DVT at low altitudes and on short flights involving healthy young people. But, to be socially robust, tests need to be replicated not only on a range of different flight environments but also to take into account the fact that many more people now fly and, therefore, that each flight is now more likely to contain a medically much more diverse population. Both these conditions need to be absorbed into the research process. In the production of socially robust knowledge, the research design, the methodologies employed and the range of data used are closely linked to knowledge held not only by university scientists but by individuals and groups outside as well.

In this case, to put the matter simply, the more it is accepted that the design of research protocols depends critically on knowledge 'possessed' by passengers – that is, their ages and medical histories – the closer one will move toward socially robust knowledge. But the capture of the knowledge the passengers have will be all the more effective if, indeed, they are involved at the

formative stages of the research design already. Further, the greater the extent to which society is aware that a wide range of individuals – likely to be affected by the research outcomes – have contributed to the design of the testing procedures, the more acceptable the results will be when they finally emerge.

To the wag who once asked, somewhat rhetorically, whether it would be preferable to travel in an aeroplane designed on the basis of reliable knowledge or one designed on the basis of socially robust knowledge, the answer is obvious. The socially robust aeroplane will always be, by far, the safer vehicle, not only for military personnel but also for me!

University outreach in a knowledge society

It must be becoming evident that the reverse communication between society and science and the imperative to develop socially robust knowledge requires a different perspective on the traditional activities of the multi-task university: not only on teaching and research but on their outreach function as well.

In the previous context, universities could consider *engagement* with their communities in terms of outreach but, in the new context, because society now speaks back, the nature of outreach has been modified to include the intensity of 'in-reach'. Of course, the dynamics of 'in-reach' require a fundamental transformation in the openness of universities to its publics and it will require that academic institutions develop new competencies, establish new career paths for their staff and introduce new incentive structures.

Indeed, if there is a single implication for universities of the emergence of a knowledge society, it is this: engagement must become a core value.

Concluding remarks

In sum, and to express the matter slightly differently, universities have demonstrated through their efforts in scientific research that they can produce the discoveries that benefit society; their methods, however, have been based upon the specialisation of knowledge and an increasing division of labour. In other words, they have produced reliable knowledge through a process of differentiation. In the new context, where the task is to produce socially robust knowledge, this entails becoming *integrators of knowledge*, the majority of which may be held by others.

However, the production of socially robust knowledge cannot be left to simple-minded aggregation of viewpoints or to *laissez-faire* in the naïve hope of automatic progress. Integration needs to be facilitated and managed and, to do this, specific knowledge and skills are essential. And it is something that requires developing competencies because integration needs to be done, not just once, but again and again.

It is but a small step, then, to grasp that any engagement strategy will be effective to the extent that universities embrace reverse communication. Further, when engagement is a core value, this will become evident through the extent to which universities do actually develop their skills, create the organisational forms, and manage the tensions that will inevitably arise when different social worlds interact. It is by commitment to resolving these tensions that universities will be able to demonstrate that they have embraced engagement as a core value.

The challenge for the universities of the 21st century will be to learn how to build on their strengths in disciplinary research and how to manage the tensions between the production of reliable information and the

production of socially robust knowledge. To embrace this form of engagement entails that universities themselves be prepared to participate in those fora where complex issues will be initially and tentatively broached, perhaps long before a research question can be formulated. To do this, they will also need to broaden their skills base and to revise their incentive structures.

A concluding scientific paradox

Finally, to return to the matter of autonomy, universities are the homes of discipline-based research and, as such, they have been on the frontline in the institutional defence of university autonomy. Universities, as institutions, have seen it as their function to protect research from the intrusion of non-scientific determinants that might limit, alter or, in some way, constrain the unfettered pursuit of scientific inquiry.

It is common enough then for universities to seek to exclude from the research process outsiders: those who have not been through the appropriate, largely discipline-based, acculturation and legitimisation processes, people who prefer leaving it to others to interpret their findings or to have them applied to other contexts. Here autonomy is exclusionary and defined in terms of freedom from 'illegitimate' outside interference.

One effect of this view of autonomy is that - in most universities - research has been organised in similar ways with specific procedures for quality control; that is, principally, in discipline-based departments. This has remained substantially unchanged at least since the end of the Second World War. However, if the university department is the organisational form that carries discipline-based research, the structure

necessary to underpin the production of socially robust knowledge is the *network*. Networks tend to emerge in situations where knowledge requirements are multi-faceted, as they originate from a diverse range of sources, and where continuous feedback is essential. Through networks, knowledge, which may be distributed globally, can be configured to a variety of useful purposes.

As has been indicated, to achieve competence in the production of socially robust knowledge, some form of 'integrator' is needed. In the knowledge economy, then, networks, initially informal ones, form the organisational embryos from which knowledge integration begins to take place.

Let me explain. For knowledge producers generally, networks are a way of pooling risks of various kinds: for firms, the risk of a competitive threat; for university scientists, the risk that one might miss out on a major intellectual advance which might touch or transform, or even eliminate, one's research project. Sharing knowledge by forming networks can reduce such risks.

But, moving from sharing knowledge informally in networks to producing it jointly with the wider community, more integration is required; a more formal set of arrangements, typically, some type of non-hierarchical flexible type of project organisation. This is the type of integration which involves cross-boundary collaboration work and is perceived by some to be a direct challenge to current scientific orthodoxy because networks and collaborative projects can not only generate new knowledge that lies outwith the norms of disciplinary science, but they can also weaken disciplinary loyalties, reduce somewhat the status and role of individual creativity and require non-conventional forms of quality control procedures. A brief

description of how cross-boundary action might work is outlined in *Appendix 1*.

Because the universities, and the sciences they house, remain institutionalised as independent bureaucracies, it is very difficult for them to grasp how to embed in wider sets of relationships that extend beyond disciplinary boundaries, and indeed beyond the university, while underpinning and preserving their autonomy rather than undermining it.

But in a society where the rates of both knowledge production and uncertainty are coupled, the greatest need for individuals - as well as for institutions - is to access the work of others; the greatest danger is isolation. The increasing use of networks to structure the organisation of complex research projects is no accident. Networks are a response to the vulnerability of isolation not only for academics engaged in scientific research, but also for any organisation that depends for its future on knowledge-based innovation. In this respect, at least, universities are in the same position as many other organisations. In all cases, participating in networks is an individual, managerial, and institutional coping strategy. If we are to believe what economists, political scientists, sociologists and business managers are saying and beginning to document, then we can expect networks and project-based forms of organisation not only to increase but more importantly to constitute the leading edge in many research areas.

However, it is essential to recognise that in the organisational forms that are spawned by network structures, autonomy implies not freedom from interference but close engagement with communities; that is, interacting with individuals, groups and the institutions of civil society of the sort that we have already described as elements in the production of socially

robust knowledge. Paradoxically, in the network environment that characterises the knowledge economy, we are freer when we share what we know with others; free, indeed, not least from the economic constraints that uncertainty puts on our intellectual development, our careers or our futures.

When these uncertainties are reduced we are not only more autonomous but also possibly more creative. Autonomy is not threatened when engaging in the joint production of knowledge beyond the boundaries of our scientific and scholarly specialisations. The reverse is true. When we strive to maintain boundaries and pursue individual and old-style institutional autonomy, we reduce our access to information and expose ourselves to the dangers of intellectual isolation in what are increasingly complex and volatile research environments.

It is because of these factors that, in the post-Humboldtian university, I believe that engagement in the production of socially robust knowledge is to be the prime guarantor of university autonomy into the future. Note, however, that the autonomy in question remains an *earned autonomy*. It rests on a demonstrated competence in the techniques of knowledge integration. The university has traditionally been very weak in this aspect of knowledge production; yet this is the constant message of the reverse communication from society it has to face now.

I was asked to elaborate on the theme of the multitask university in the context of the emerging knowledge society and economy, while keeping in mind the central concern of the Magna Charta, i.e., to develop and strengthen the institutional autonomy if universities. Hopefully, it is now clear that the adoption of engagement as a core value not only modifies the universities' traditional outreach function but also touches

their current core commitments to both teaching and research since it affects the way they carry out all their activities. Multi-tasking remains; outreach, however, needs to be coupled to in-reach: and in-reach goes to the core – i.e., the ways in which teaching and research are pursued in universities.

The implications (not to say challenge) for universities are that they need to become centres for the production of socially robust knowledge and demonstrate to their communities that they have developed the expertise to do so. Universities, because of their long established commitment to knowledge for its own sake, are the ideal institutions to demonstrate that they are perhaps the only establishments in society that can rise above politics, partisanship and vested interest while addressing complex problems beyond those associated merely with technological innovation. Society now asks universities to be willing and to have the competence to support their communities through integrating the knowledge necessary to deal with an increasing array of complex problems of social concern.

More direct engagement in terms of teaching and research with civil society is thus essential to demonstrate to society that universities intend now to serve the public good. That universities should serve the public good has been at the core of the social contract with society and the universities since their inception, though it has been reformulated many times to reflect changing social circumstances. The terms of engagement are being reformulated once again to meet the exigencies of our day.

Thank you for your attention!

Appendix 1

Transaction spaces: the 'how' of it all

The interaction of contextualisation and the production of socially robust knowledge in network forms of organisation are the outcome of broad changes in society as well as in the production of knowledge. But it is contextualisation that provides the most direct route to discovering the implications of these broad changes for engagement between society and universities.

Accordingly, we turn to examine the 'how' of contextualisation and its the practical impact on the intensification of reverse communications between society and the universities. There are three elements that need to be considered: the degree of contextualisation, boundary objects and transaction spaces or trading zones.

Degrees of contextualisation

Three different degrees of contextualisation can be distinguished: weak, middle range and strong, depending on the strength of the reverse communication. In weak contextualisation, society speaks back largely through the voices of its institutions that, with the advice of experts, interpret in research terms the social concerns of the wider society. Paradoxically, most government-funded programmes are of this type since their research is typically set in the context of some social or economic objective. Yet, the process of contextualisation is weak because social demand – say for more research into road safety - is still communicated through the filters of bureaucracy to which, in due course, the scientific community is expected the 'respond'. The programmes originate at one remove, so to speak, from the concerns of either people or scientists. In strong contextualisation,

the reverse communication involves from the beginning the direct participation of civil society - and even of individuals - in the identification and formulation of problems and issues. Medium strength contextualisation lies somewhere between these two extremes. In sum, each level of contextualisation - from weak to strong - describes a mode of knowledge production in which problem formulation and implementation is more closely engaged with society. Further development of this position can be found in M. Gibbons et al. (1994), H. Nowotny et al.(2001) and P. Scott et al.(forthcoming).

A thought-provoking example of strong contextualisation has been described by Latour in his analysis of the development of research into muscular dystrophy in France. (Latour, 1996) Here, a group of individuals – scientists, administrators and most importantly patients - initiated the discussion. One underlying assumption was that muscular dystrophy could be advanced if more of the knowledge that patients had about their own condition was taken into account in formulating research questions. Indeed, this idea was taken forward and can be seen, perhaps most dramatically, in the design of the administration building where there is a definite 'space' for patients and where their inputs can be constantly fed into the research process. Public policy did not drive this initiative, nor was government funding sought. Rather, muscular dystrophy was, initially at least, funded directly from the public through a sequence of telethons. It was as if patients were unwilling to wait until muscular dystrophy reached the top of somebody else's research agenda. They acted independently and, it must be said, with great effect. Strong contextualisation is evident here in the close interactions between people (patients), scientists, and administrators/fund raisers. Interestingly enough, attempts to cure muscular dystrophy in France now include a research programme in medical genetics.

But the research undertaken in this field has been contextualised, in part, by knowledge about the disease that has been drawn systematically from the experience of large numbers of patients. It would be interesting to investigate whether research pursued in this way opened up avenues of exploration or made discoveries different from those that emerged through the conventional operation of France's national research system.

Boundary objects

In the process of contextualisation, a way must be found to encourage experts and others, who may be connected informally but nonetheless inhabit different social worlds, to interact effectively in transforming an issue or problem into a set of research activities; that is, one needs a way to transform an informal network into a formal one. In this, two things - boundary objects and transaction spaces - are essential entities if cooperation is to be promoted and consensus generated.

The notion of a boundary object is simple enough and can be elucidated by using a very mundane example. Consider a man and a woman walking in Hyde Park, in London. Socially, it is still very awkward for the man to approach the woman, or vice-versa, with the aim of striking up a conversation. It is not impossible but it is awkward and, because the intent of the 'first move' is ambiguous, defensive mechanisms can be expected to be brought into play. However, if both parties happen to be walking their dogs, then, of course, a conversation might originate around the 'dogs', while other issues remain in the background - for the time being. In this example, the dogs constitute a boundary object. Neutral entities around which information can be exchanged help create the conditions for a dialogue on other, more serious matters, in due course. Boundary objects help in the consti-

tution of 'spaces' where discussion and debate can begin and relevant information be exchanged.

In research, typically, the boundary object is not a dog but a concept or idea which refers to a scientific object or objects that both inhabit several intersecting social worlds and satisfy the informational requirements of each of them; for example, the generation of a new research facility in some aspect of bio-science, or the construction of a large longitudinal database in social science or a complex tunnel project as was the case in Boston recently. 'Boundary objects are objects which are both plastic enough to adapt to local needs and the constraints of the several parties employing them, yet robust enough to maintain a common identity across sites. They are weakly structured in common use, and become strongly structured in individual site use. These objects may be abstract or concrete. They have different meanings in different social worlds but their structure is common enough to more than one world to make them recognisable, a means of translation.' *(Star, S.L., et al. (1989), p. 393)*

Transaction spaces and trading zones

Not every boundary object will generate an effective transaction space. In the early stages, these 'spaces' provide an important framework in which still tentative, and as yet inadequately institutionalised, interactions can take place. However, these interactions are more than random encounters. To the extent that they do develop into genuine transaction spaces, they have some of the essential features that Peter Galison has described for the 'trading zones' he came across when analysing the history of nuclear physics in the twentieth century (Galison, 1997). In this work, we are made to encounter – within the disciplinary structure of one sub-field – the fascinating exchanges and intense collaborations between three

sub-cultures of the nuclear physics community: theoreticians, experimentalists and engineers (who build the machines used in nuclear physics). These traditions remained intact, preserved inside the collaboration, while the co-ordination of exchange took place around the production of the two competing instrument cultures of 'image' and 'logic', which ultimately joined. In this case, the choice of the technology to be used in detecting the fundamental particles functioned as boundary objects.

Taking his lead from anthropological theories, Galison observes how often the exchanges between the various sub-cultures of physics can be compared to the incomplete and partial relations which are established when different tribes come together for trading purposes. Nothing in the notion of trade presupposes some universal notion of a neutral currency. Quite the opposite: much of the interest in the category of trade is that things can be co-ordinated (what goes with what, for what purposes) without reference to some external gauge. Each tribe may bring to this interaction and take away from it completely different objects as well as the meanings attached to them. An object, that may have a highly symbolic or even sacred value for one tribe, may represent an entirely banal or utilitarian object for another. Nevertheless, interaction and trade are possible and actually take place to the obvious benefit of all because, if this were not so, dialogue would have ceased.

Trading may also give rise to the emergence of contact languages, like 'pidgin', as a means of communication that is inevitably incomplete and truncated. Galison's insight was that physicists and engineers were not engaging in translating knowledge from one sub-culture to another as they pieced together their microwave circuits, nor were they producing 'neutral' observation sentences, as the philosophers would wish them to do. Instead, they were working out a powerful, locally

understood language to co-ordinate their actions. Despite obvious limitations, some kind of understanding and exchange does occur in such situations.

For Galison, then, the crucial question was not 'how different scientific communities passing like ships in the night' *communicate with one another. It was rather* 'how, given the extraordinary diversity of participants in physics – cryogenic engineers, radio chemists, algebraic topologists, prototype tinkerers, computer wizards, quantum field theorists – they speak to one another at all. And the picture … is one of different areas changing over time, with complex border zones that sometimes vanish, coalesce, and even burgeon into quasi-autonomous regions in their own right.' *(Galison, op. cit. p. 63).*

The idea of transaction spaces, as developed in this paper, is an extension and generalisation of the concept of a trading zone beyond interaction amongst scientific sub-cultures to wider exchanges that take place across both disciplinary and institutional boundaries. The idea of 'transaction' implies, first, that all partners bring something that can be exchanged or negotiated and, second, that they also have the resources (scientific as well as material) to be able to take something from other participants. Of course, the meanings attributed to the exchanged objects may differ greatly for different participants. But the success of these exchanges depends upon each participant bringing something that is considered valuable by someone else – whatever that value might be. Participants usually will return to their 'home base' with their gains, thereby re-enforcing the links and exchanges that have already occurred by sharing with others.

As may already be becoming evident, the three aspects of contextualisation - society speaking back to science, boundary objects and transaction spaces - can be used to underpin a new language of engagement. *This can be*

illustrated by returning for a moment to the work of Peter Galison. He notes that a 'trading zone is an intermediate domain in which procedures can be coordinated locally even where broader meanings clash. … The work that goes into creating, contesting, and sustaining local coordination is at the core of how local knowledge becomes widely accepted.' *In other words, rather than depicting the movement across boundaries as one of translation (from theory to experiment, or from military to civilian science, or from one theory to another)* 'it may be more useful to think in terms of work at boundaries, where local languages grow, and sometimes die in the interstices between sub-cultures'. *As has already been indicated, under the prevailing social contract, the language of engagement is largely about moving knowledge across boundaries, in particular from universities to society.*

This point can be illustrated by reflecting on the mechanisms that are currently in place to render more efficient the translation of scientific discoveries from universities to industry. Working, silo-like, with the discipline-based structures of science and scholarship, it is often presumed that the knowledge produced by universities is in some way primary. For example, scientific discoveries are commonly regarded as essential ingredients for successful technological innovation and, not infrequently, universities have assumed that they are the prime source of many of these ideas. Accordingly, we tend to think it important to move this knowledge across boundaries. This language is perpetuated at several levels: with regard to cognitive boundaries in the translation from pure to applied science, with regard to institutional boundaries in the translation from universities to industry, and so forth. Given the prevalence of the idea of translating knowledge across boundaries, it is perhaps not surprising to find that many universities and government agencies have put in place administrative struc-

tures – research managers, technology transfer offices, innovation incubators, science parks, etc. – to help with the translation of knowledge across boundaries.

The notion of a transaction space shifts the metaphor from translation across boundaries to dialogue **at** boundaries*. This shift underscores precisely that it is dialogue at the boundary that makes it possible to access knowledge held by others, and appropriate it by promoting the search for a common language within which to treat a problem or issue. As Galison has argued, common languages, when and if they occur, provide the 'evidence' that some sort of common understanding has been achieved. By contrast, simply moving information 'packages' across boundaries leaves much unsaid and, not surprisingly, it is often the case that such translations are not successful.*

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Counterpoint from Latin America

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I have been asked to react to Michael Gibbons´s paper from the perspective of a Latin-American scholar. A word of caution, however: to speak of 'Latin-America' as if this notion did exist in real terms is most unlikely. Yet, generalisations being what they are, allow me to develop points of view that could be easily contradicted in the details of regional or national perspectives. Indeed, my duty is to react to the intervention we just heard by considering the problems Michael Gibbons addressed from a European perspective in function of the continent to which I physically belong, Latin-America. This is one allegiance among many since my intellectual affiliation, for instance, is to the same community we all consider to be part of, i.e., the international academic community. At that level, I feel one among equals, especially when pressed to preserve the social responsibilities of the university as well as its autonomy and freedom – when it comes to carry its academic duties.

Quite interesting is the proposal to define the current European university as a multitask institution. In my region, most of the universities – or institutions of higher education in general – are still dedicating their efforts to a single task, the training of people for the professions; they have not yet opened themselves to other responsibilities, in particular scientific and technological research – which, when it exists, is left mainly to the large metropolitan state universities – other institutions, in the field, being too small, and often too weak, to be able to contribute to the production of knowledge next to its dissemination. In a way, in terms of institutional development and identity, Europe and Latin-America are following parallel lines while staying worlds apart.

To take up the challenge of this counterpoint, I would say that in my region three different approaches tend, in a way or another, to affect the balance between teaching and research in universities:

1. There are those who are committed to university transformation from the *academic point of view;* they follow those lines of institutional reform traditionally initiated by international organisations like UNESCO, and their aim is to improve institutional quality using the recommendations made by the world Conference on higher education held in Paris in 1998. These people tend to speak of a new contract about the dissemination and exploration of knowledge between the government, the private sector and the universities – a topic highly popular in the region as from the early 1990s after the demise of the autocratic regimes in Chile, Argentina and Brazil. The Chilean José Joaquin Brunner, the Brazilian Simon Schwartzman and I had been very enthusiastic about possible new ways to

engage the university in meeting the needs and demands of society at large, in the Latin American and Caribbean region. Somehow, things have not evolved according to our expectations.

2. Secondly, there are those who would see the situation in *techno political terms*. For instance, the university in the region is trying to articulate its principles and values as an institution when it is confronted by forces wishing in fact to eliminate these values – academic freedom and autonomy for example. To survive, academic institutions ground in ideological and political views their management of both the training for the professions and the training for research. Taking the perspective of the university autonomy needed in a knowledge society, I fear then that such a political context risks putting the institution under the control of state policies. This submission to national strategies of social redistribution could induce the emergence of weak management in academia and, ultimately, of potential academic corruption. This remark goes beyond academic freedom to cover the concept of freedom in an open society in general; from this point of view, one should address the issue of university development placed under the threat of government interventions that are prone to alter internal academic balances in the universities, a risk all the more important that the social environment is typically non intellectual. Some countries in the region are in deep difficulties, indeed, because they do not provide the friendly intellectual environment that was identified as essential by Burton Clark in his 1998 study on the new European universities, especially when he speaks of the need to 'stimulate the academic heartland'. This call for cross-fertilisation had been also mentioned by Ronald Barnett in 1997 or by myself, in 1991 already. However,

several governments in the region show an open hostility to higher education and tend to make of universities simple stepping stones on their way to undivided power, the recurrent dream for many a political leader in my part of the world, from Pinochet to Castro – the latter having been in power for almost half a century; he represents a model now emulated in my own country, Venezuela, where the *líder máximo* now expects to rule until 2030 – after some seven years in power already. Of course, such governments search to redefine the relations between academia and society at large: by offering institutions a new contract that reduces university initiatives to the participation of the academic community to social transformations guided from above; this often translates into the appointing of university authorities by the government, rulers who tend to neglect or ignore the opinions, feelings and technical criteria that shape and have shaped academic communities around the world, and that have structured traditional university culture – in Europe in particular.

3. Finally, there is the reaction of radical groups, acting from within the universities. They represent those segments of the academic community that are constantly searching for ways to control *university power* from the inside in order to use the institution as an instrument for political and ideological change. This tradition goes back to the mythical Cordoba Movement (Argentina, 1918), a process of socio-political transformation spearheaded by academia that had repercussions all over the region. This approach implies the dissolution of academic contracts passed with a society that anyway needs to be reshaped. Thus new rules of governance have to be set up that allow for political ideologies to take over the universities, as

if under strict totalitarian regimes. This is the approach much heralded by those who search for a kind of post-modern repositioning of higher education along the lines of thought expressed in 2002 still by people like Richard Taylor or others of the same persuasion: they have many followers in the region, particularly in countries like Argentina and Brazil where many cherish the idea of higher education as a crucible for messianic forms of revolution. In that case, research like education become tools of predetermined social changes.

There are at least two more points I would like to mention here. One is the fact that the region I come from has made a contribution to world knowledge production of less than five per cent; and this volume of participation is not increasing with the growing influence of technicians and ideologues in the area. Actually, while new emergent powers appear on the world academic map, especially in Asia, the Latin American rate of participation is slowing down – since governments, in particular, are not providing the necessary resources; nor does the market as it is too small or too dependent on outside research forces. The pressure for the production of knowledge is all the more feeble that academic communities, at this stage of development, still consider themselves to be the training ground for the young rather than innovative centres for the management of new ideas. A question of ingrained behaviour.

The second point is related to the fact that whenever I listen to Europeans speak about university reform, I hear them consider for granted both political peace and a growing autonomy from governments – public authorities trying to establish new contracts of accountability including the universities' role in European inte-

gration, their weight in rapid economic and industrial development, should Europe compete successfully with both the USA and Japan as far as the scientific and technological creation or the transfer of knowledge are concerned. In that context, one should remember Ron Dearing´s 1997 admonitions on *Higher education in the learning society*, when he explained that successful nations need to rely on, commit to and invest in higher education if they are to survive in a highly competitive world. True, peace was not a constant in European history and it is most useful to read again texts like Karl Mannheim's *Diagnosis of our time*, written in1943, to remember how much things have changed in Europe over the last sixty years. Such a document keeps its actuality if applied to the current situation in Latin-America. When totalitarian political and ideological forces imposed their views in Europe, there was no time nor opportunity for academics to reflect on social contracts: they simply tried to survive and hoped for better times. This leads me to ask whether the European academic community should not pay more attention to the authoritarian trends re-emerging in Latin America and the Caribbean – as they do in Africa. In several instances, developing countries are not trying to articulate the terms of a new academic contract; rather, their institutions try to save elements of old social and political contracts that sustained and protected academic freedom. This is why I feel that the Magna Charta Observatory should play a role in this context. Autonomy in our part of the world is not only a value to be earned, as suggested by Gibbons, but also a principle to be defended, which is entirely another matter.

On to a final note in which I would like to use a metaphor to illustrate my reaction to Gibbons' brilliant paper: I see the university in my region as oscillating

between two extremes, that I would call Davos and Porto Alegre. From the Davos point of view, liberal political economies provide the necessary framework for the success of the university, the market acting as the regulator of the academic activities that are needed to provide knowledge to the industrial machinery of growth. On the other side of the spectrum, the university is perceived as an appendix of governments able to design the national project of which the university is a cog only. As far as I can see, universities need to hit a middle ground where these two extremes can be reconciled through the use of academic language and codes, the university offering a platform of universal debate for rational reflections that allow expression both of doubt and of a strategic will for change. Those who favour the Davos view risk enslavement to economic power, and those who prefer Porto Alegre submission to political re-engineering; for example, the latter create *aldeas universitarias*, like in Venezuela, i.e., 'academic spaces' that bring higher education to the villages – 'where the people are' – a well-meaning approach to universal higher education but a proposal that makes not much sense in districts whose populations do not enjoy more than basic education. Investments in the transmission of knowledge then turn to be extremely onerous, making funds for innovation and research all the more rare, so that universities remain places of teaching rather than research – to use the terms of this conference. The balance between the two needs to be explored fully if the terms of engagement of the academic community in Latin America and the Caribbean are to be considered creatively.

As mentioned at the beginning, the region of Latin America and the Caribbean does not simply reflect *one* stereotype of permanent political instability that inval-

idates the creation of higher education institutions of world class calibre. There are also countries moving forward to keep pace with countries and universities of the developed world. Mexico, Costa Rica and Chile, just to mention these three examples, are enjoying both peaceful and vibrant academic times and some of their universities are taking the necessary steps in the direction of functional academic reforms. Brazil is definitely a leading country in these matters, where one finds what is probably the finest academic environment in the region – around the city of Sao Paulo – what Talcott Parsons would call a 'cognitive complex'. But in several other countries - and in most institutions – reforms are still needed; in some cases the higher education systems are imposed a kind of heavy state control that is often insensitive to the delicate web of social relations that make a university function properly, this balance of opinions and power that is defined by the principles of academic freedom and autonomy. In such countries – Cuba and now Venezuela – the course of public enforcement has become the norm at the risk of killing the chances higher education has to be of real use to society, away from ideological regimentation. Too often, in these cases, 'revolution' has become an alibi that hides the real facts: when universities are not free to sustain independent teaching and research, they cannot be accountable for their action as partners in the development of societies that have often invested enormous resources in higher education. New modes of connecting research and teaching are indeed the order of the day, not only in Europe and OECD countries, but also in the whole international academic community, Latin America included.

Science as a Practice: Extending University Autonomy by combining Research and Teaching

Prof. Paolo Blasi
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Mr President, ladies and gentlemen, dear colleagues,

For me it is a pleasure and an opportunity to be here at the 'Magna Charta yearly event 2005' to celebrate the 17th anniversary of its signature. It is a pleasure in fact to meet so many friends with whom I have shared the commitment of enabling universities to face the new challenges imposed by the knowledge society in the new globalized context. It is also an opportunity, as I will certainly learn a lot from all of you – bright people fully engaged in reshaping the university for the 21st century needs.

Therefore, I wish to thank the President of the Magna Charta Observatory, Professor Fabio Roversi Monaco, and the Secretary General, Andris Barblan, who have invited me here for a talk on "Science as a practice: extending university autonomy by combining research and teaching".

Finally I want to acknowldege Professor Ulrike Felt's paper that represents a deep and interesting analysis on

the research-teaching nexus in a post-humboldtian environment. Such document offers a wide and rich background for the present meeting with plenty of stimulating suggestions. I will often refer to it in my speech.

The new context

When I was a student of physics at the University of Florence, in Italy, only a few percent of the 19 years old attended university courses: this was the same in almost all European countries. Student selection started just after the elementary school and ended with the 'maturità' (baccalaureate).

The university's main task was to educate students to become leaders and managers in society and to train them for some well defined professions.

Today, about 50% of this same age cohort attends university courses in Europe and the trend is such that we can expect this percentage to grow further in the next future. It is unquestionable therefore that universities have at present a very different job to do. Certainly they still have the duty to prepare the future leaders and managers but this involves only a small percentage of their students. Others are educated for classical professions but the largest part of the students must be trained to become active citizens in a complex and fast changing modern society. Moreover, in many cases, graduated students are engaged in jobs not directly connected with their university studies and, furthermore, they are expected to change jobs many times during their life!

Therefore universities have to face many new and very different tasks as Michael Gibbons has shown to us eloquently this morning. But how have universities and governments reacted to these new challenges?

To face the growing demand of higher education, governments have established many new universities, have improved the teaching facilities (buildings, classrooms, laboratories, libraries, etc) and have opened new positions for professors, researchers, technical and administrative staff. Finally, in the last ten years, they have given more autonomy to the universities.

Nevertheless little has been done to reshape the universities' identity by changing the contents of training, the way of teaching and the research organisation, by proving and adapting their governance to the new situation. The Bologna process, which has been set up to give suitable answers to these problems, is shared today by 45 countries, and involves almost all universities in Europe; to face properly the multiplication of university tasks, it spurs academic institutions to rethink their organisation, their teaching methods, their research activities, and in particular to reorganise and reshape the learning and training activities asked for by new social demands.

Actually, when considering the spectrum of employment possibilities that are available for our students, we realise that only a few percents will be engaged in research activities but that 10 to 15% will be hired by industry, another 10 to 15% being employed in traditional professions (lawyer, doctor, civil engineer, etc) while the remaining 70-80% are to work in the 'third sector' where there should be many – and continuously changing – kinds of jobs.

New needs

Such a situation and the evolution of traditional activities, not to speak of the growing mobility and flexibility in the job market, have changed the skills needed for a successful working life.

First, students must learn how to learn; then they must be able to communicate to interact positively with other people, to manage information technologies, and to speak some foreign languages; they must develop critical skills and creativity; finally they must become 'managers' of their own selves.

Therefore, on one hand, curricula (in particular for a three year degree) should focus on general education mainly to develop skills and good practices, instead of simply providing information; on the other hand, a request exists also for specific curricula aimed at particular jobs. In the first case most students are expected to continue to the second degree level; in the second, after their first degree, the students are to look directly for a job coherent with their training. The Bologna process opens many possibilities in the organisation of courses, and the credit system facilitates the students' decisions and their mobility. But universities have found it very hard to react properly to so different requests: some have decided to set up parallel courses with few crossover possibilities; others have kept the old curricula schemes alongside with the new ones.

In my opinion, the Bologna process requires the universities to rethink completely their teaching organisation; therefore, the professors must change deeply the contents of their courses and the way to present them while taking better account of the varied goals of today's higher education and training. Moreover, the offer of degrees and courses should change over time and match demand. As a result, professors must grow conscious of the need for more flexibility - and also for more availability in order to meet new teaching needs.

Some other problems arise: for example, what to do if the best students are not to forego their potential, which would be harmful for them and for society? Can

courses of different levels be organised in the same university or should special universities be set up for the best students? These are open questions that need answers and actions - as soon as possible. In my opinion, there is not only one option: we must leave the doors open to different solutions, not only between different countries, but also within one country and inside one university. This all requires more autonomy for higher education institutions.

Autonomy is indeed necessary for a single university to react properly and in a timely way to these challenges although, in my opinion, this is not enough. Probably we need, at least in Italy, to strengthen university governance: bottom-up proposals are useful because they commit people but top-down decisions are also unavoidable to operate deep changes and to open the universities to new demands in teaching as well as in research. How can we assume that faculty councils - where professors in traditional disciplines form strong lobbies - can really open to changes requiring their commitment to new disciplines or to interdisciplinary subjects? To work properly, autonomy should be integrated with personal responsibility, with strong governance and good behaviour; therefore it must be challenged by both incentives from the market through competition and by the state through financial awards.

The role of research in education

Students must be educated to the general skills that enhance their 'culture' but they must also have practical capacities to answer the needs of the job market. To reach such goals, universities must provide high quality cultural courses, on one hand, and organise for the students, on the other, internships in a working environment. As personal initiative and creativity, together

with critical judgement, are important skills, the more effective internships, in my opinion, are those done in a research group or research infrastructure. This is what happens for PhD studies when a student participates in a research project within a research group; in some universities, such training possibilities are spreading not only to graduate students but, in recent years, also to some undergraduate students. We should pay attention to this positive trend which could be most fruitful. There is of course a problem of compatibility between a large number of graduate and undergraduate students and the few research places available today in groups or infrastructures. This begs questions that have never been completely answered: should every university be a research university? Should every university teacher be a researcher?

In the 80s and 90s many people thought that with the increase in the number of students it would be unavoidable for the university system to be articulated in a few research universities and many teaching universities. As the knowledge society has gradually replaced the information society the situation has changed.

The knowledge society and the knowledge economy need people who are well educated and with skills that are in fact typical of a researcher - curiosity, creativity, a sense of initiative, an entrepreneurial capacity and an open mind: a citizen in the knowledge society must be able indeed to develop his/her capacity to reflect upon the questions he/she raises, the type of knowledge he/she produces, and the impact his/her knowledge might have on society.

For me, these capacities and skills can be best acquired through a direct research experience. Therefore research as a direct instrument of education is becoming more and more necessary for a growing

number of students, in such a way that universities are asked to provide them with the opportunity to experiment research activities as part of their studies. I am convinced that universities will lose in the future the capacity to be competitive in the higher education market if they are not able to offer to their students the possibility of internships also, either in research infrastructures or in research projects. This can be done within or outside the university since it is clear that not every university can have large laboratories or be involved in all fields of research; yet, in my opinion, university professors must all be engaged in research activities - in their university, in another university, in a private laboratory, in a research network or, finally, in an international programme.

To teach research methodologies, to stimulate in the students specific interests for research, one must have been or must still be personally involved in a real research activity. For me, this remains a specific and unique character of university work, thus making these institutions of higher education different from all others. *A contrario*, this is also why in England polytechnics have become universities and why, in Germany, the *Fachhochschulen* are pushing to be allowed PhD programmes, a first step on the way to becoming a university.

Unity of knowledge

I want to emphasise another point that, in my opinion, has a growing impact on higher education: the multidisciplinary and interdisciplinary approach necessary to tackle many of the main problems of modern society. In fact, research is more and more project driven and projects, to be financed, must deal with problems important for society – like energy, new materials,

information and communication technologies, environment, climate, health, etc. All these subject, however, require competences in many disciplines.

This means that, although disciplinary knowledge does remain essential (in particular to get familiar with specific methodologies and languages), it also becomes more and more important to be able to interact with disciplines others than the one in which we are educated; this is necessary if we want to contribute to the solution of many of the real problems we are facing today.

Therefore, how can we reinforce the capacity for a multidisciplinary approach to a range of various problems? How can young students be educated to develop a multidisciplinary behaviour?

We are all aware that still today university teaching and research are organised in disciplines which tend to stress the differences between each other in order to maintain their specificity. In fact, this division has produced the amazing development of the knowledge feeding our disciplinary fields. On the other hand, we are also more and more aware that a full exploitation of our human potential can only be obtained through a more comprehensive approach to reality; such an approach needs an education to the management of knowledge as a single entity – even if it is composed of many different parts.

Everybody wishes to reach the unity of knowledge because this is the way to build up our human potential fully, i.e., to reach wisdom. The unity of knowledge therefore should become an important objective for higher education institutions. But what does mean the phrase 'unity of knowledge'? In my view, it does not mean the sum of the contents of all the disciplines that can be found in an encyclopaedia, an attempt to collect in books all existing knowledge, thus realising some

kind of formal unity, but outside of man; on the contrary, I understand the unity of knowledge to be a *'habitus'*, an attitude that shapes the human being's development. The university must help students to develop such a *'habitus'* and, since almost all disciplines are present in a university, it is possible to establish integrated curricula to develop first multidisciplinary skills and then meta-disciplinary attitudes that represent the background for constructing one's own unity of knowledge.

Such a *'habitus'* or 'knowledge unity' must differ from one student to the other, since it is reached through different paths, on the basis of different attitudes that rely on a specific personal potential but it provides young people with the education suitable for life in the knowledge society and, hopefully, for achieving what I call a 'wisdom society' in which the enormous potential of the knowledge society can be exploited in favour of – and not against – mankind.

Research as a practice

Research as a practice is an important tool for an up-to-date higher education, not only for PhD students but also for graduate and undergraduate students: to meet such a demand, the universities have to establish a new organisation of their teaching activities; thus, they should offer internships by widening their interaction with other research institutions, be they public or private, sharing research labs and programmes with them or extending cooperation with enterprises – both in the industrial and service sectors.

I believe that the most efficient way to transfer knowledge from university to society (in fact a new mission for higher education institutions) is the mobility of people in both directions: intermediate structures

are often too slow in the transfer and should be avoided whenever possible. If we agree that the transfer of knowledge from university to society is one of the three main missions of the university, professors then must be allowed to commit to this task. Partnerships with private and public institutions and enterprises should be encouraged by incentives – for instance, the elimination of the many bureaucratic and formal obstacles that exist in so many countries (such as Italy). Professors must be evaluated, appreciated and supported for what they do - not only in research but also in teaching and in the transfer of knowledge – rather than being only assessed in function of what they are *not* allowed to do.

Research as a practice is compulsory for PhD students since we suppose that many of them will become future scientists. In fact, the knowledge society and the knowledge economy, in which innovation plays a strategic role, ask for more and more research activities: the latter represent the natural background for innovation; this requires more scientists both for academic needs and for the external market – even if the market demand for PhD graduates differs widely today from country to country.

The universities can fulfil these needs with good doctoral programmes offered to an increasing number of PhD students; if necessary, such programmes should be differentiated into those aiming to prepare researchers for academic careers and those for researchers who will choose the external employment market.

When I talk about 'innovation', I mean not only product and process innovation in industry, but also in administration procedures, social organisation, laws and rules, as well as innovation in service activities. In other words, innovation today is a must in all aspects of human and social life; that is why, in the context of the

knowledge society, every discipline and field of knowledge needs to be involved in research for innovation.

A recent recommendation of the Commission[1] (Brussels, March 11th, 2005) concerning the *European Charter for researchers* and a *Code of conduct for the recruitment of researchers* emphasised: 'The identified potential shortage of researchers, particularly in certain key disciplines, will pose a serious threat to the Union's innovative strength, knowledge capacity and productivity growth in the near future and may hamper the attainment of the Lisbon and Barcelona objectives. Consequently Europe must dramatically improve its attractiveness to researchers and strengthen the participation of women researchers by helping to create the necessary conditions for more sustainable and appealing careers for them in R&D'.

The first expectations of PhD students are to make a career in the research field, at the university if possible. Due to the restricted number of permanent academic positions available, only 10 to 30% of PhD students fulfil such hopes today. Moreover, although the PhD and postdoctoral students form the backbone of Europe's scientific research, they are generally under- or mis-employed. In different countries, European PhD students often experience difficult situations, both in social and financial terms, while enjoying little infrastructural support. Moreover, precariousness entices PhD candidates to accept in parallel to their studies any additional job: they take up teaching duties, for instance, or badly remunerated assistance work in research projects. As a result they usually suffer significant delays in their training.

[1] Commission Recommendation on the European charter for Researchers and on a Code of conduct for the recruitment of Researchers, Brussels, 11/03/2005 C(2005)576.

These facts produce in certain research areas, relevant for the future development of society, a lack of attractiveness in research among young people: universities are therefore called to find ways to regain scientific glamour, through better work conditions, better social assistance, though opportunities to participate in best quality research programmes, through mobility, and through recognition for a future career of the work done as PhD students; all this should improve the attractiveness of science, in particular among the most talented and more motivated students.

Universities, professors, local and national authorities, international commissions, entrepreneurs, all have to play a role to meet this strategic challenge.

In the recent 'Recommendation' quoted above, the Commission affirms that 'the ultimate political goal [...] is to contribute to the development of an attractive, open and sustainable European labour market for researchers' and, therefore, that 'member states should endeavour to offer researchers sustainable career development systems at all career stages, regardless of their contractual situation and of the chosen R&D career path [...] and to ensure that researchers are treated as professionals and as an integral part of the institution in which they work'. Member states must 'continue their effort to overcome the persisting legal and administrative obstacles to mobility, including those related to inter-sectoral mobility and mobility between and within different functions, taking into account the enlarged European Union'.

Scientific culture

We are all convinced that sufficient and well developed human resources in R&D are the cornerstone of advancement in scientific knowledge and technological

progress, thus enhancing the quality of life, ensuring the welfare of citizens and contributing to country competitiveness. We have seen the importance of 'producing' a large number of researchers and I have mentioned also the need to educate more and more students to the values and skills connected with the research activity. This will help develop a culture that, while aware of scientific methodologies, nurtures the right attitude to the results of science and technology.

The 20th century in Europe has been characterised by the diffusion of some ideologies like communism and nazism that, as a final objective, wanted to impose their ideas and models to the whole world in spite of reality: they produced the second world war and its terrible consequences, both for people and countries. On the other hand, faith in science and technology led people to think that definite answers could be given to their daily problems. Then the atomic bomb effects, ecological problems, new health difficulties have induced people, especially in the young, to develop a deep mistrust for a science that could have such a negative impact on human life.

It is today necessary to recover a new balance in the analysis of the problems we are facing. We have already talked about an education which could develop attitudes in order to move towards a unity of knowledge; in a global world, this is also linked to the capacity to listen and to understand each other, thus respecting cultures, religions, languages and traditions. If such goals are to be met, we need not only science and technology but also ideals and ethical aims, i.e., a reality contemplated without prejudices. In other words, people should be educated to give reality a true grounding and to expect from science partial answers only, based on the probability of events, the understanding of phenomena, but certainly on no definite truths. Therefore,

improving the scientific culture of people through direct experience in research activity as a learning process will contribute to set up a more evolved society: it will enable people to manage more responsibly the complexity of our modern life, and reinforce the cohesion of society.

Autonomy and academic freedom

Autonomy is necessary for universities to meet the new constraints of knowledge and to react properly and in time to the demands and expectations of the outside world. But autonomy is something different from 'academic freedom'. The Magna Charta considers autonomy as its first and fundamental principle: 'the university is an autonomous institution at the heart of societies differently organised because of geography and historical heritage; it produces, examines, appraises and hands down culture by research and teaching. To meet the needs of the world around it, its research and teaching must be morally and intellectually independent of all political authority and economic power'.

Today, as universities are institutions open to the society and widely interacting with enterprises and many other institutions, more care must be put to safeguard autonomy in research and teaching; this means in particular to avoid conditioning as to the methodology and the use of scientific means, while accepting to extend cooperation when defining curricula or some shared objectives for research projects.

The autonomy must be guaranteed by governmental laws and its potential exploited by the governing bodies of the universities and by academia.

Academic freedom belongs indeed to people, in particular to the researchers and professors, as, today still,

this concept represents a core element of academic self-understanding in spite of the fact that, over the last decades, the higher education profession has been 'reinvented' in many ways, in order to take account of the new missions and the new context in which universities have now to operate. The Magna Charta confirms: 'Freedom in research and training is the fundamental principle of university life, and governments and universities, each as far as in their lives, must ensure respect for this fundamental requirement'.

Despite its current high level recognition, the understanding of academic freedom has suffered a gradual shift from a rather idealistic to a more pragmatic vision of research and teaching freedom. Teaching freedom is thus being restricted to the questions of method and, in part, to the content of a course that, anyway, must be coordinated with the other courses composing a specific approved curriculum.

In *The European Charter for Researchers*, research freedom is reported as follows: 'Researchers should focus their research for the good of mankind and for expanding the frontiers of scientific knowledge while enjoying the freedom of thought and expression, and the freedom to identify methods by which problems are solved according to recognised ethical principles and practices.

Researchers should also recognise the limitations to this freedom that could arise from particular research circumstances (including supervision, guidance, management) or operational constraints, e.g. for budgetary or infrastructural reasons or, especially in the industrial sector, for reasons of intellectual property protection. Such limitations should not however contravene recognised ethical practices and fundamental ethical standards as documented in the different national, sectoral or institutional Codes of Ethics'.

Ethical values and behaviours in science

Ulrike Feld writes: 'In a research and teaching environment increasingly characterised by competitive pressures and unstable work situations, by strict time schedules or by the constant quest for new research funds, the upkeep of high scientific standards for knowledge production and their transmission to the next generation have certainly become hot issues'.

She raises some important issues: 'What is the impact on research practice and knowledge production of the hybrid context in which university research is increasingly taking place, an environment that mixes basic research, application oriented work and business type activities? How can value systems be transmitted to a younger generation in a mass university?'

The European Charter affirms: 'Researchers need to be aware that they are accountable towards their employers, funders, or other related public or private bodies as well as, on more ethical grounds, towards society as a whole'.

Codes of ethics and recommendations for good behaviour in the research activities have therefore been drafted and made available. However, cases of misconduct in research are still detected.

The researcher's misconduct can have three aspects.

The first concerns *ethical misbehaviour* which depends on the poor moral education of the researcher. This lack of ethical values and practice can be tackled through a more efficient action as to the education offered by the family, the school and by other institutions; the question is to improve the level of social morality. Codes of ethics provided by different institutions can help and are useful in particular when action by an institutional authority is needed. In Finland, the National Advisory Board on Research Ethics (set up in

1991) strongly recommends to integrate research ethics into the students' curriculum, thus creating early awareness of the problems and giving a general identity to specific cases when they arise.

The second aspect of misconduct concerns *scientific individual behaviour* (i.e., good scientific practice) and is limited to professional values (deontology) specific to a researcher. As for professional responsibility, the European Charter affirms that 'researchers should make every effort to ensure that their research is relevant to society and does not duplicate research previously carried out elsewhere. They must avoid plagiarism of any kind and abide by the principle of intellectual property and joint data ownership in the case of research carried out in collaboration with a supervisor and/or other researchers. The need to validate new observations by showing that experiments are reproducible should not be interpreted as plagiarism, provided that the data to be confirmed are explicitly quoted. Researchers should ensure, if any aspect of their work is delegated, that the person to whom it is delegated has the competence to carry it out' and 'methods of collection and analysis, the outputs and, when applicable, details of the data should be open to internal and external scrutiny, whenever necessary and as requested by the appropriate authorities'.

Cases of scientific malpractice have revealed the new constellation in which knowledge is produced, validated and distributed. Actually, the science system is influenced by many changes: the multiplication of places where knowledge is produced; the trans-disciplinary and temporary co-operations around more problem-oriented issues; the central role played rather early in the research process by expectations of application and by the fact that 'external' values are increasingly present - in particular in the evaluation of quality.

Nevertheless my feeling is that such cases of fraud just prolong phenomena that have existed throughout the history of science. The scientific community has been and is aware of the possibility of such frauds: often, when a case happens, the responsible scientist becomes so isolated that he/she never recovers the trust of the scientific community. To me, the system seems to work properly and does not need further action. The scientific community knows that science as an enterprise relies, after all, on relations of trust that consider scientists as 'people of exception', of a moral level higher than that of other members of society. To maintain such credibility, which makes science work properly, eventual frauds have to be brought to light, the guilty have to be exposed, the latter losing credibility. Indeed, the public needs to be convinced that in any case 'Good science wins at the end'.

The third aspect of researchers' misconduct is connected with the *transfer of scientific results* to society, in particular through the media (television, newspapers, internet, etc).

The most common weakness – or sin – among researchers and professors is 'vanity': many scientists like being on television, giving advice to politicians or granting interviews to journalists. They like stressing the potential of their research future applications: thus, they point to the potential for health care of some new molecule or drug; they make forecasts on earthquakes or about the weather for the following months or years. I think that such a behaviour is very harmful to the credibility of science and to society's trust in scientists and in science. Trading the future can be dangerous, also because an inadequate description of future scenarios can play a fundamental role in deciding where science should go or how universities should define the profile of their research - and consequently

of their teaching activities. Unfortunately, whenever funds are needed, the question of the potential impact of the knowledge to be created gets high on the agenda, i.e., results have to be envisaged, argued and made plausible – as Ulrike Felt mentioned earlier.

Vanity or some other personal interest can also lead some scientists to grant to politicians or journalists the advices they ask for as definite answers. When, later on, reality shows differently, people start losing trust in science and the scientists – again with great damage for society.

How can university researchers and professors avoid an instrumental use of their research results, and how can they reinforce the credibility of scientific results and advice, that are so important for the good development of society? My partial and incomplete answer is that we have always to refer to the verified results that are built on the mass production of data or on papers that can be shared and accounted for by the scientific community. This is easily understood by academics but difficult to accept by politicians and journalists. The political use as certainties of partial results or of mere hypotheses leads to inappropriate actions, thus affecting public confidence in the integrity of science.

To deal with misconducts in the three aspects just outlined, universities have established extensive codes of practice and defined guidelines on how to deal with allegations of malpractice; but more can be done by being more proactive, in particular in the relations with the external environment; this means taking the issue of scientific culture and practice as a topic of central interest.

More autonomy, more institutional and personal responsibility are needed to reach these goals in mass universities; however, as most universities in Europe

are funded substantially by the state, an adequate national system of institutional accounting is also necessary together with an internal assessment of university activities and of personal academic behaviours.

In conclusion, to improve university action and its impact on the evolution of society, it is necessary in my opinion to deregulate further the institution, thus granting a larger degree of freedom to universities. This should be balanced by a strict regulation of competitiveness that would deny rewards to the universities that do not follow properly the rules established.

Thank you for your attention!

Counterpoint from an educationalist

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> *We know about them, but how do we deal with them? On the weaknesses inherent in the development of the idea of the university.*[1]

The discussion on the development of the university and its underlying idea has in recent years been lively, often interesting as it oscillates between being very optimistic and somewhat pessimistic. However, in this general discussion, I think there are serious weaknesses that are perhaps acknowledged by those who participate in the debate but are not sufficiently addressed by all of us, unfortunately. Even if the continued strength of the universities is not at stake, the academic establishment should indeed not only pay special attention to the weaknesses described below but

[1] These pages represent reflections on Prof. Blasi's address in Bologna: they have been developed somewhat for publication and I am grateful for the substantive comments my colleague Páll Skúlason made on my interim draft.

also'proact'[2] to them. These weaknesses will be considered from three perspectives:

- *The connection between research and teaching* in the university, what has been called here by Ulrike Felt the teaching-research nexus: have we analysed sufficiently why this relation is important, what it entails, how uniform it is and how universally it applies to academic disciplines?
- *The question about the unitary character of the university*: how do we harmonise on one hand our discussion about a multitude of functions – the multitask university mentioned here by Michael Gibbons and Paolo Blasi – that can lead to a variety of universities or to the setting up of multiversities, and on the other hand our implicit unitary idea of the university?
- *What is the functional rationale for the university*: is the post-Humboldtian notion of universities national or universal (global)?

The research-teaching university nexus

> *Have we analysed sufficiently what it entails and how homogeneous it is?*

Wilhelm von Humboldt really set the stage for the research-teaching nexus that we now take for granted as a fundamental characteristic of the university. But why is it so important? Humboldt had a fairly clear-cut answer[3]:

[2] This play with the word-pair, *reactive-react*, suggesting the analogy *proactive*-proact, underpins my belief that universities should be proactive rather than reactive.

[3] Humboldt, W. v. 'On the Spirit and the Organisational Framework of Intellectual Institutions in Berlin', an 1818 text published again in 1970 in *Minerva 8*, pp 242-250.

> 'At the higher level, the teacher does not exist for the sake of the student; both the teacher and student have their justification in the common pursuit of knowledge. The teacher's performance depends on the students' presence and interest – without this science and scholarship would not grow. If the students who are to form his audience did not come before him of their own free will, he, in his quest for knowledge, would have to seek them out. The goals of science and scholarship are worked towards most effectively through the synthesis of the teacher's and the students' dispositions. The teacher's mind is more mature but it is also somewhat one-sided in its development and more dispassionate; the student's mind is less able and less committed but it is nonetheless open and responsive to every possibility. *The two together are a fruitful combination* (p. 248, my emphasis)'.

Are they a fruitful combination? And why? I think it is important for universities to reflect on this general question and try to figure out an answer. The philosopher Alfred Whitehead[4] echoes and elaborates this very idea with great clarity, thus helping understand better why – and perhaps to what extent – it applies to the model situations we usually have in mind:

> 'The justification for a university is that it preserves the connection between knowledge and the zest of life, by uniting the young and the old in the imaginative considerations of learning. The university imparts information, but it imparts it imaginatively. At least, this is the function which it should perform for society. A university which fails in this respect has no reason for existence. This atmosphere of excitement, arising from imaginative consideration, transforms knowledge. A fact is no longer a bare fact: it is invested with all its possibilities. It is no longer a burden on the memory: it is energising as the poet of our dreams, and as the architect of our purposes (p. 97).'

[4] Whitehead, A.N. *The aims of education: and other essays,* New York, New Amercian Library, 1929 and 1949

For both Humboldt and Whitehead, it is quite clear that engaging on their own either in teaching or in research is certainly not sufficient to make an institution a university. Both functions are required. And when these functions are conducted in concert two crucial elements should emerge: the combination of imagination and zest that is fostered within the framework of the university, on one hand, and, on the other, the transformation of facts into knowledge that takes place within the university environment. These are the Humboldt-Whitehead criteria that I suggest must characterise the relationship between teaching and research in an institution if it is to be classified as a university.[5]

That a university has a teaching function is not debated. But what about research? This is not entirely clear.[6] Thus, may we ask: what is the function of research within the university arena?

In recent times one definition of the university, the high profile *research university*, has become the prevailing prototype; however, the over-riding emphasis it gives to research is not required by the historical argument and its pre-eminence does not indisputably follow from the primary aim of the institutions of higher education. In fact, this definition draws from the rhetorical norm and the role models which have developed, especially in the United States, in the 20th century. The model of the research university can perhaps be traced back to Humboldt and his contemporaries

[5] This is a narrow perspective and additional criteria could be considered. See Nybom (2003, p. 144) who suggests five cornerstones for the Humboldt university.

[6] This is for instance explicitly not required by Newman's idea of the university (Newman, 1852). But I do not think anybody would suggest that a research institution that has no teaching function should be classified as a university.

since the personal and cultural characteristics of these visionaries have indeed contributed to the inherited features that shape this 'idea of the university'. Yet, this does not close the issue considering that there is still a wide spectrum of fundamentally different institutional arrangements allowing for a fruitful relationship between research and teaching, even if they have little in common apart from an inspiration from university traditions going back to the German neo-humanists.

May I suggest five different levels of combinations between research and teaching in order to point to the importance of the nexus' various shapes? These are presented in cumulative or hierarchical layers:

1. The inquiry level (the critical attitude)
2. The research participation (or research impregnated) level
3. The research training level
4. The knowledge production level(s)
5. The interpretative level - the public research space.

In their own right, these different levels may all be taken to characterise the research/teaching relationship that is required in an institution called *a university*.

1. The inquiry level

The first reason for weaving inquiry into all disciplines is the reflective, critical stance it fosters, an attitude now generally considered to be crucial for university graduates, whether in an academic or in a professional course, as they are all supposed to take initiatives in the dynamic development of their field of work. Beyond such a pragmatic rationale for emphasising a critical and inquisitive attitude in all learning situations, inquiry has also a pedagogic and personal value since investigative approaches are very valuable for learning. We label this research function the *inquiry level,* or

research at the first level. This form of systematic inquiry-oriented methods is current at the primary and secondary school levels,[7] and such approaches are now finding more and more their way into tertiary studies, for example through case-based studies, which are best known in medicine and business administration. It is interesting to note that, although research is said to be important for university studies, it rarely permeates, by tradition, the province of teaching.[8]

2. The research participation level

Another reason for universities to engage in research is that modern society now accepts – or even requires - research to be an important and integral part of the development of every field of activity. Thus, in addition to the critical stance contributed by a research atmosphere, it becomes sensible and even necessary to introduce research activities in all institutions of higher education, thus familiarising[9] a variety of professionals with the ethos, language, techniques and importance of scholarship and research, i.e., the work modalities that most graduates will be exposed to, mainly at master's level, or will be using to an increasing extent in their future occupations. Thus, a serious introduc-

[7] There is a variety of approaches characterised inter alia as Socratic learning, discovery learning, inquiry learning, project-based learning or problem-based learning.

[8] I suggest that, on the whole, even the teaching activities that most resemble research, that is the practical or experimental laboratory sessions in the natural sciences, have often more affinity with an apprenticeship session for a technician than the critical reflections of a researcher.

[9] Perhaps this term is too weak, but so is *initiate*; and *introduce* and *immerse* are too strong.

tion of research into the curriculum of all disciplines, be they professional or academic, is important, even though the express educational aim of such a development is not achieving research expertise or research skills. We call this the *research initiation* level or the *research participation* level.[10]

3. The research training level

Research is also conducted at a university for the express purpose of *training* researchers, indeed, but not necessarily to perform at a high level of academic research. Some universities stress such a special role as their own, using the fact that they have an express task, advancing knowledge. The research trainee, normally a doctoral student, is placed in a setting where she is among expert researchers, is initiated into a culture of ambitious and fertile scholarship and is taken through the drills of the investigative techniques of her field. We call this the *research training level*. It subsumes the technical know-how in the area, and thus has an explicit training component. The most appropriate training institutes are perhaps those which are entrusted with substantial advanced research activities and that have an ambitious level of scholarship; in each case, however, it must be determined what kind of research and training environment is deemed to be necessary and sufficient to allow for such a training function to develop. For instance, there is no clear relationship between the prestige of academic research within an institution and the quality of its research training!

[10] There are a number of open questions here, for instance whether this level is required for educating what is sometimes called 'reflective practitioners', or if the previous level suffices for that purpose?

4. The knowledge production level

Research can also be undertaken for the advancement of knowledge. Modern society, since it is obsessed by economic returns, requires a high level of research activity leading to concrete results; therefore, research promotion (for material development) is high on the agenda of most governments. Traditionally, this research function has been entrusted either to specialised research institutions, within industry and government, or to the universities. This activity is carried out by specialists of the discipline, people who know their field and are well versed in the special techniques such research requires, people who also benefit from an environment that is sufficiently endowed to undertake this specialised task. May I call this the *knowledge production level?* This is now sometimes divided into sub-levels, e.g. the Mode 1 and Mode 2 levels.[11] The reasons why this task has often been placed in universities are manifold, but it has been repeatedly argued (by both Humboldt and Whitehead, as we said) that this function is university congruent because of the dynamic interaction that often exists between the teaching researcher and the researching student. Hence, combining research training and knowledge production within a particular institution can make special sense[12,13] – even if much of this type of research

[11] Gibbons, M., *The new production of knowledge: the dynamics of science and research in contemporary societies*, London, 1994, SAGE Publications

[12] This is of course often done, and such universities are normally called research universities. It might be noted that Humboldt's analysis applied primarily to the stage of study which we now term post-graduate and the Americans, who were perhaps the first to adopt the Humboldt model explicitly and extensive-

can be conducted outside the university; therefore, it should be spelt out clearly, in each case, why the university is a valuable arena for conducting important parts of such research projects.

5. The interpretative level[14]

In a recent study of innovation in the US, Lester and Piore[15] argue that some crucial types of research activities can only thrive in the public spaces provided by the university environment, even though a lot of both pure and applied research (of the analytic type) can also grow outside the walls of academia, in particular within the private industrial sector. In fact, they suggest that an advanced economy cannot thrive for long without the interpretative research environment provided by the universities. This fits well with Whitehead's notion of *imaginative transformation*, that he sees as the crucial ingredient of a university environment.

ly, adapted it primarily to their graduate schools. But it is probably fair to say that my own university, the *University of Iceland,* which for a very long time was primarily a professional school with a number of undergraduate fields of academic subjects, nevertheless felt from its very beginning in 1911 that it was operating on the basis of the Humboldtian ideology, claiming that the institution was clearly a *university* in that sense.

[13] But there are also other important reasons for combining research and teaching within an institution. Among those are the opportunities to connect academia and industry and to relate theory to real problems and most important the venue the teaching function provides to communicate ongoing research to newcomers to a specialized field.

[14] This is not strictly an argument for the close relationship between teaching and research, but nevertheless an argument for conducting research within the purview of the universities.

[15] Lester, R.K., & Piore, *Innovation, the missing dimension*, Cambridge, Mass:, Harvard University Press, 2004

Assuming this classification to be generally acceptable (at least for the time being) we come to the crucial question: what levels of research activity and consequently what relationship between teaching and research must be present for an institution to be received as a *bona fide* university? Does the institution need to be involved at the *knowledge production level* and if so, why? Or, to ask the question in a different way: why is it not sufficient for an institution to be characterised by the first two or three levels in order to be classified as a proper university? To use modern parlance: is a university that is not a 'research university', not a real university? And why not - considering that the modern university may not be as homogeneous as is sometimes assumed in present discussions?

The unitary character of the university

> *How do we harmonise our discussion about a multitude of functions, a variety of universities or even multiversities, with an apparently unitary idea of a university?*

The volume of university operations has grown exponentially in most western countries during the 20th century[16]. This growth is still going on at a considerable speed and has been documented from a number of very different perspectives[17]. Such an obvious, dramatic and

[16] Cf Jonasson, J.T., 'The Predictability of Educational Expansion' in I. Fagerlind,I. Holmesland & G. Stromqvist (Eds), *Higher Education at the Crossroads. Tradition or transformation?* Stockholm, 1999, Institute of International Education, Stockholm University, pp. 113-131

[17] Cf. Jonasson, J.T., 'What determines the expansion of higher education?' in I. Hannibalsson (Ed.), *Rannsoknir I félagsvisindum V*, Reykjavik, 2004, University of Iceland, pp. 275-290; Kerr, C., *The uses of the University* (4th ed).Cambridge, Mass,

pervasive change has now been acknowledged by nearly everybody, often in a very explicit way. Nevertheless, despite this enormous growth and resulting heavy load of work, there is a strong tendency to talk about '**the' university** as a unitary or a homogenous entity based on a number of all-encompassing functions and modalities. And even though we know that this binding of various operations is not really relevant, we still indulge in a global perception of our multi-sided institution – perhaps for two reasons. First, because we want this to be true: indeed, we would like all the institutions we call 'universities' to share the same basic values which they can manifest as common fundamental characteristics – so that we can cherish and defend them forcefully. The other reason is a corollary of the first: we do not quite know how to talk about higher education otherwise; we are not yet accustomed to distinguish between different types of institutions, while taking account of their variety or of the classifications indicated above. If our incapacity to change discourse is true, our problem becomes that, although a wide spectrum of institutions offer many types of higher education, we still consider them as facets of a single phenomenon. It is not clear that they are. In fact, how specific can we be, both about the nature and the extent to which autonomy, academic freedom, excellence, research and the teaching-research nexus is an obliged part of that institution we call a university? Do these many qualities apply equally to all institutions or do they represent generic terms only – with very little

1994, Harvard University Press; Trow, M., 'Problems in the transition from Elite to Mass Higher Education', in *Policies for Higher Education*, Paris, 1974, OECD, and idem, 'From Mass Higher Education to Universal Access: the American advantage', *Minerva*, 37, pp. 303-328

in common – which implies very little thrust and no political bite? I suggest that our hesitations are partly due to the fact that we have not really thought through the link between academic essence and institutional existence in the shaping of universities.[18]

Earlier, I have put forward different arguments concerning the teaching-research nexus at universities by introducing several levels or layers of investigative activities. Using the idea of inquiry, research or scholarship as a point of departure it is very easy to argue, and consequently to accept, that serious inquiry (level *one* in the analysis above, i.e., a fundamental attitude of curiosity) is an integral part of every institution of higher education - not to speak of other educational levels as well. Therefore, in addition to teaching, a modern university should nurture 'enquiry' as an integral component of its identity. But it is also obvious that each line of reasoning invites a different type of investigative minds, all these approaches being woven into a tapestry of research and teaching that differs from one institution to the next.

Hence, what research rationale, what research involvement are to be considered sufficient to make an institution a university? Would any one of these levels be enough? To the extent that these are hierarchical levels of research involvement, I suggest that, apart from inquiry, *research participation* is necessary, and

[18] It is very difficult to leave this statement without substantial elaboration which I will, however, not undertake. Some people define the university very narrowly and appear not to be burdened with the problems discussed here. Different legislatures also define the tertiary stage in various ways, such as framing their systems as unitary (all institutions defined as universities) or binary (dividing the tertiary sector into universities – still with widely differing characteristics – and polytechnics).

perhaps sufficient, for an educational institution to be classified as a university. Some institutions, however, are aiming higher in the research hierarchy, research participation for some, research training for others, if not knowledge production and advanced scholarship for others still; with their specialised purposes, they would all be correctly classified as universities. In other words, we can have more than one type of modern universities when we accept that there can be qualitative differences in the nature of the research activity undertaken at university and thus differences in the relationship between teaching and research.

But what of the 'research university's' claim (as an institution characterised by knowledge production) to have the exclusive right of the name 'university'? Is it not simply wrong even if institutions emphasising their own research, doctoral training and teaching at all levels are more likely to foster the symbiosis of teaching and research that satisfies the Humboldt-Whitehead criteria taken to be the fundamental characteristics of the university? But these activities should not simply coexist within the same institution. Or, if they did, they could easily pull university institutions below the research training level. In fact, research participation may suffice to satisfy the Humboldt-Whitehead criteria. Conversely it may also be the case that an institution runs ambitious research training programmes in certain departments only, but claims full university status, even if several parts of the institution do not aim so high.[19]

[19] The last three sentences are meant to convey the idea that I do not want to treat this issue as a matter of simplistic classification. It is much more complex than that. I am rather suggesting a way to address the problem of defining the university as a family of institutions with reference to a complex notion of the relationship between teaching and research.

The functional rationale for the university

> *Is the post-Humboldtian notion of universities essentially national or universal (global)?*

At a very preliminary level the response to the question is both simple and paradoxical. The fundamental values of the university which are moral, cultural and scientific essentially refer to a paradigm of universality.[20] But the pragmatic rhetoric on which state support is based is essentially national (if not regional or local). This discrepancy presents problems and has done so for a long time.

When I follow the history of 'the idea of the university', in particular the Humboldtian one, I have the vision of an institution impregnated with learning and wisdom. It is essentially a cultural institution, which has the task of engaging in, cultivating, fostering and transmitting a patrimony that is continuously renewed and updated.[21] In such a context, research is emphasised as an essential component of the institution's operation. The university is also an educational institution, and thus has characteristics that distinguish it clearly both from the academies of sciences, and from schools. This notion seems to have considerable affinity with the idea developed by

[20] See a discussion of this issue in Páll Skúlason's ms on *Ethics of Universities*, a paper presented at Bemidji University on 10 August 2005.

[21] A number of authors have concerned themselves with this and attempted to trace the idea of the university, (see e.g. Kerr, 1987, 1994a, 1994b; Nybom, 2003; Readings, 1996; Ridder-Symoens, 1996; Rothblatt, 1997, 1999; Rothblatt & Wittrock, 1993). Nevertheless, I experience the modern general discussion about the mission of the university as strangely ahistorical and unproblematic.

Newman in his 1852 lectures on 'The idea of the University'.

But this cultural argument was from the very beginning understood in a nationalistic form – Berlin University in 1810 was to be a counter-model to the Imperial University set up by Napoleon; later, with industrialisation, it acquired also an economic dimension in order to foster national welfare. Thus, instead of 'knowledge for the sake of cultural development' (i.e. an argument for science and education) we have 'science for the sake of national and technological progress' (an argument combining political and economic purposes). The form of the argument is still the same but there has been a subtle, and as it turns out, a fundamental change in its content.

This change has induced confusion in all the debates about the universities as far as both their goals and the motivation to support them are concerned. The problem is twofold. On one side, the emphasis is on the economic function versus the ethical or cultural (scientific) role but we still talk about the institution as if it were essentially an educational institution cultivating ethical or cultural values; indeed, the university may have become, according to the dominant rhetoric, a training institution, thus restricting education to its technocratic and economic expression. On the other side, the problem is that we tend to cling to the universal reference (ethics, culture and, in particular, science) but that, at the same time, we feel committed to the university as a public institution, obliged by the local or national needs of society rather than by those of mankind in general. In other terms, we are torn between various areas and paths of intellectual involvement.

We should be attentive, anyway, to the clear nationalistic role which the 'Humboldt university' was given

by its creators in the early nineteenth century.[22] The university was clearly established as a national instrument; it was seen as a prime tool for nation-building, for preserving, enhancing and promoting the national culture of Prussia and then, later in the 19th century, the economic strength of Germany. And similar aims still prevail in many situations of today, in particular under the guise of the university's role as a public service, a function that is constantly being reiterated.[23] The argumentation for state support and, even more, the demand for the empowerment of the universities, is essentially nationalistic still. It was argued, and it still is, that universities are the most important tool for underpinning and building first the basic institutions of the nation-state and then the national economy.[24] This would perhaps not cause serious problems if it were not for the fact that prominent ingredients in contemporary proposals for the financial support of universities are the declared needs of important, and relatively expensive, natural and technical sciences.[25] These sciences are claimed to be of universal (or at least supranational) value, but the fact is that in many (and very important) cases, they are perceived of direct (although

[22] This was very clear in the German states, but was even more obviously the case with the Napoleonic universities in France.

[23] There is a host of texts that bear witness to this (see as examples Neave, 2000; Weber & Bergan, 2005) or the April 2005 EU recommendation on 'Mobilising European brainpower to achieve the Lisbon objectives'.

[24] This argument was very clearly stated by Nybom in 2003 when he noted that von Humboldt may have intended to build essentially an educational or an academic institution, but that he also realised that such an establishment would need pragmatic grounding in order to ensure the support of the State.

[25] Here I refer to the establishment of adequate research facilities and not to the teaching part.

non-specific) relevance for the development of the national economy.[26] Thus, the proponents of universities, even at regional level, are suffering a kind of schizophrenia characterised by strong national or regional arguments clothed in universal dresses supposed to give an extra glow to the limited specific value universities can draw from the immediate society to which they belong.

To sum up

I have argued that there are important flaws or weaknesses in the contemporary discourse on universities which need to be dealt with. Firstly, I suggested that there is a general consensus that the relationship between teaching and research is fundamental to the university but I also claimed that the reasons for this are lacking and these reasons need to be brought forward, perhaps along the lines given in this paper. Secondly, I maintained that it is unclear whether there is one or many types of universities; I concluded that there are many types of institutions that could rightly be called universities and

[26] It must be spelt out that I am here very explicitly distinguishing between the local (national) and the global economy. As this is such a contentious stance to take, it needs to be explained carefully. I accept that the progress of science carries with it a variety of benefits, in particular economic ones, on a global scale and also for each individual society or nation as it is a member of a community of nations. We should all contribute and thus we should all gain. But this rhetoric is certainly not sufficient in the tough arena of local politics. A small community is not going to pour money into ambitious and enormously expensive projects on the grounds that the group will reap the benefits eventually, as the world will gain important understanding of its reality and thus become a better place to live in. It might however finance projects for specific local reasons.

that the so-called 'research university' is just one of them. Thirdly I suggested that the proponents of the universities tend to confound global and local argumentation and that the discrepancy between the somewhat localised national rhetoric of the politicians and the global flavour of the arguments forwarded by academics tends to weaken the case for the universities.

I believe that the university sector and the idea of the university could be better served if we succeed to deal with the weaknesses which I have focused on and if this effort can help the universities to overcome the flaws they suffer from in their daily struggle for life.

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Tomorrow's Universities: how do they Balance their Teaching and Research obligations?

C. Peter Magrath, President
National Association of State Universities and Land-Grant Colleges, Washington

Mr President, the Rector of the University of Bologna, ladies and gentlemen, dear colleagues,

I would like to begin my presentation with two quotations. The first is from the great European statesman and visionary, Jean Monnet: '*Life is prodigal of opportunities to act, but one has to be prepared, by long reflection, to recognize them and exploit them as they occur. Life is made up of nothing but events; what matters is to use them for a given purpose*.'

I also quote an African proverb: '*Do not look behind you with regret, nor ahead with fear. Rather look around yourself with awareness*.'

As a newcomer to a Magna Charta conference, my task is to help provoke your thinking and our sharing of ideas by putting the European perspective into a broader context. More specifically, I am to discuss the issue – the challenge – encompassed in the connection and tensions between teaching and research within our universities, two essential functions of what we may

also call knowledge institutions. And I will comment, particularly from my American perspective, on the pitfalls or temptations that affect universities in the 21st century.

It seems to me that we need to consider the worldwide context or environment that influences all leading universities, despite their differences due to organisational arrangements and the cultural settings of their diverse countries. I list three factors that impinge on all our institutions:

1. The first is that, whether one likes it or not and regardless of the precise terminology used to describe it, our world today is far more 'closer' and interconnected than it ever has been. This is a consequence of modern technologies, the speed of travel and communication, and of course the enormous impact of the information technology revolution. We are in a globalised or interconnected world in which nations both collaborate and work together, even as they often compete for economic advantage; today multi-national businesses work to promote their economic interests regardless of the nation where they have their corporate headquarters. This phenomena leads to increasing linkages and ties between leading research intensive universities whether in Europe, North America, Japan, China, or Southeast Asia – because research universities are key producers of knowledge that is vital to businesses and economic development. This circumstance creates issues and challenges especially for those universities that I will define as 'Western', encompassing Europe and the English speaking nations of the world.

2. Virtually every nation with a substantial economic base or potential sees universities as essential to its economic success – that depends on an educated workforce that is adaptable and can continue to learn as

needs and circumstances change. And, of course it is also in universities that research, whether designated as 'pure' or 'applied' or 'mission-oriented', produces invaluable economic knowledge. The knowledge institutions of Europe and the United States, and increasingly those of China, India, and Japan, are vital to economic and social development and to the strengthening of their societies.

3. Financing – finding the resources for universities – is always a struggle; it continues to be a challenge because I know of no nation prepared to make the kind of investments in universities that those of us here would prefer. Yes, some public investments are being made, but there are enormous pressures on universities to be entrepreneurial and to help themselves by generating resources through collaborative partnerships with businesses and other agencies. This, it seems to me, is one of the strong messages that flows out of the Lisbon Agenda, and its ambitious objective of making the EU the most developed and vibrant knowledge region in the world. As I understand the trends, many of the issues confronting the entrepreneurial university in the United States are becoming apparent in Europe too.

Moreover, in my consulting work with universities in central and eastern Europe, and especially in Russia, I encounter a deep interest in finding revenue sources beyond (always inadequate) staff support: by universities developing ties with local businesses and industries and multinational corporations. This quest is highly entrepreneurial and market driven, and it includes of course systematic efforts by universities – especially in the Russian Federation – to attract tuition revenue from students who pay for their education as opposed to those subsidised by the State. Similar trends are emerging in Chinese higher education as that country expands its university system.

Speaking from my perspective, these developments and trends are part of the new realities facing higher education worldwide throughout the world. They are to me inevitable and do not trouble me – if we can be wise in managing and leading these changes in ways that preserve the ultimate autonomy of universities. We must retain our ability to provide education in the form of teaching or learning and research or discovery that is of the highest possible quality and undertaken with intellectual integrity. A paper presented a few months ago by our colleague, Dr. Andris Barblan, at the *'Triple Helix Conference'* in Torino provides a fascinating tour of universities and their knowledge as they relate to regional development in three European cities. Barblan's paper speaks for itself, but clearly makes the point that *'the universities and other institutions of higher education of research have regained a high priority on the political agenda, especially in cities that bet on knowledge.'* But this applies to even more than the regional urban economic development that his essay examines. His paper outlines the challenges involved in social transformation and economic development that is possible through the work of universities; he notes that: *'Blue sky' research – a form of the search for truth – has great difficulty to justify large investments by the community – unless it points to the retarded effect of its 'crazy' ideas on the development of new products and services...*

Speaking now from the American perspective, the trends strike me as extraordinarily clear. In the first place, America's great public universities are receiving less and less direct investment from their state (or provincial) governments. Although state or public support will continue to be significant, it is markedly less today than it was 20 or 30 years ago – and the trend line continues to go downward. Yes, our research-

intensive universities receive federal dollars for student financial assistance (since we have high tuition fees for students), and they receive significant federal dollars for research through such agencies as the National Science Foundation, the National Institute of Health, the Department of Defence, and the U.S. Department of Agriculture. Some of these research funds are for basic or pure research, but the majority is targeted for specific purposes and expected outcomes – utilitarian purposes if you will.

This in turn has led public universities to become increasingly entrepreneurial in forming partnerships with business and commercial interests, patenting and commercialising the products of their research to generate resources for further research and the acquisition of needed facilities and equipment. Similarly, American universities are intensifying their already powerful fund raising campaigns among graduates and interested citizens who care about what universities do. In this sense the great American private universities and public universities are converging in their mission and their financing so that, say, a university of Michigan or of Minnesota is not markedly different in where it attracts much of its resources than, say, MIT or Stanford.

Yet even as American universities are increasingly entrepreneurial because of their research capabilities, all of the leading universities, public and private, are under strong public pressure and expectations also to be institutions that care about students and that value and reward teaching so that the mission of teaching and research is balanced. We have, as you well know, enormous tensions between our teaching and research obligations because the internal reward system in salaries and recognition favours the demonstrably successful researcher, who typically brings in significant money in the form of research grants, over those pro-

fessors whose primary contributions are in the teaching of undergraduate students. This overstates the issue since many outstanding researchers are equally outstanding teachers, but there is a tension that is unavoidable and will always be with us to a considerable extent. But there is no reason why universities cannot be both great teaching and research universities and why excellent teaching cannot also introduce students to the research process even early in their career as students.

Similarly, the American public university in particular has traditionally also accepted an external 'service' role that is part of its culture and obligation – though it does not attract the support and prestige attached to teaching and research. In the United States this activity typically falls under such words as 'outreach' or 'extension', and this has been a significant function of the U.S. land-grant public universities. But it is more than that: it is also a philosophical or ideological commitment that plays an important part in the culture of public universities, even those that are not technically land-grant with a historically derived agricultural education origin.

Indeed, a project in which I was involved and that was launched in the mid 1990s and known as the Kellogg Commission on the Future of State and Land-Grant Universities, led to an increasing recognition of something that we now label 'engagement'. This flows from one of the leading reports and recommendations of the Kellogg Commission that was labelled *The Engaged Institution*. The theory here is that the engaged institution is a university that serves its community and business and social interest by drawing on its research strengths and then partnering and collaborating with business communities and non-governmental organisations. This should, some

of us have urged, be a mainline responsibility – along with the teaching and research functions – of American universities, an important part of the mission of universities in, if you will, the knowledge driven society. It is also from a practical point of view a means by which U.S. universities as they struggle for financial support can make themselves appear to be indispensable and useful to their societies, thereby generating the political, public, and financial support they require if they are to maintain high quality research and teaching programmes.

The issues and challenges facing America's universities lead me to certain conclusions. The connection, the symbiosis if you will, between teaching and learning and research or discovery is central to all universities. Despite the tensions that exist, all great universities create useful knowledge by educating men and women to become knowledgeable and with the ability to learn and continue to learn throughout life. And the quest for knowledge involves not only its transmission but its continuing discovery. We never will have all the knowledge that is needed – and certainly not in a world that constantly changes. The real challenge is this: how do we maintain the autonomy of the university to be a true knowledge institution and not simply a factory of robotic mechanics whose imagination is limited to yesterday and the past rather than to the future. A recent thoughtful book entitled *Remaking The American University Market-Smart and Mission-Centred* argues that markets have been part of the academic scene from the very beginning of universities; they quote Clark Kerr, the former president of the University of California, who once discussed the tension between the Acropolis and its focus on values and missions, and the Agora, which of course is the Greek word for marketplace. Kerr put it this way:

'The cherished academic view that higher education started out on the Acropolis and was desecrated by descent into the Agora led by ungodly commercial interests and scheming public officials and venal academic leaders is just not true. If anything, higher education started in the Agora, the market, at the bottom of the hill and ascended to the Acropolis at the top of the hill . . . Mostly it has lived in tension, at one and the same time at the bottom of the hill, at the top of the hill, and on the many pathways in between.'

If the university is exclusively limited to being on the Acropolis, an isolated 'ivory tower', it will not have the financial resources it needs to perform its functions and ultimately its service to society. However, and here is the tension: if the university is exclusively limited and confined to market forces and influences, its mission and the great value of seeking and discovering truth and making truth known will be seriously impaired. The reality of this tension needs to be recognised as our universities, whether in Europe, the United States or other parts of the world, become increasingly entrepreneurial in response to the great demand for their services – for the fruits of the knowledge institution. I quote further: ... *'markets can help institutions obtain their missions and perform important public purposes. The challenge for the academy is to make sure that market success remains the means, not the end'*.

That is the challenge, and, after all, has it not always been so? Universities and the arts have always had patrons and supporters; patrons are invaluable but they also bring risks. Universities that are totally dominated by their immediate clientele, students and their desires, or wealthy patrons who want certain outcomes and results, cannot function as true creators, discoverers, and disseminators of that knowledge so valuable to

society. Autonomy and freedom is what makes universities valuable to society in the first place. It must be preserved at all costs, because ultimately it is the utilitarian way in which universities serve their societies.

As I think about these challenges from an American perspective, it appears to me that in one sense European universities may have an advantage. They are still substantially publicly supported by their countries, by the imperatives and directions that seem to be coming from the European Union, and by a culture in which public support for university education and university research and for the arts runs (even if inadequate) deeper than in the United States. I hope that European universities can retain and expand this public support. On the other hand, while European universities have always enjoyed an enormous amount of internal autonomy in their curricular, teaching, and research activities, they are, generally speaking, more externally controlled by ministries of education and by government than is the case in the United States where there are no ministries of education at the state level or at the federal level – despite the important functions of the United States Department of Education. That is not to say that United States universities are not subject to political and state pressures, particularly those that are public universities. But in most respects U.S. universities have been externally free of governmental control and excessive regulation – though maintaining that autonomy is a constant struggle!

In reading the Magna Charta and its fundamental principles, I find practical language that says it perfectly. Consider these two fundamental principles:

'The university is an autonomous institution at the heart of societies differently organized because of geography and historical heritage; it produces, examines, appraises, and hands down culture by research and

teaching' and *'To meet the needs of the world around it, its research and teaching must be morally and intellectually independent of all political authority and economic power'*.

Another principle states that: *'Freedom in research and training is the fundamental principle of university life, and government and universities, each as far as in them lies, must ensure respect for this fundamental requirement'*.

Principles are much more easily asserted rhetorically than implemented in the practical day to day world in which we live and operate. But they must be asserted. We must fight for such principles. In a world in which our universities will – and should – become increasingly entrepreneurial and involved with the marketplaces, I have a thought. Could American and European universities, even as they are friendly rivals in certain respects, *form some kind of a coalition or alliance to lobby governments in Europe and in the United States to affirm the indispensable value of this autonomy and freedom*, the autonomy that makes them so extraordinarily valuable to their knowledge economies? It is also my hope that leading universities in Europe and the United States will, even more than is currently the case, collaborate in their educational programmes in their teaching and research in ways that our imaginations today might not even comprehend. European and American universities, at their roots and in their heritage, flow from a culture that on the large issues is fundamentally similar.

I conclude by returning to my opening quotations – Jean Monnet's reminder that life presents many opportunities to act, and that we should recognise and exploit them; and the African proverb that we should not fear looking ahead but should look around with awareness. A great opportunity I see, if we look around

with awareness, is that America's and Europe's universities can do great good in future as they have in the past by collaborating in their teaching, research, and engagement activities – and, even more urgently, in asserting why autonomy and freedom of inquiry is the essential core of a knowledge society.

Thank you for your attention!

Counterpoint: Science as a social enterprise.

Prof. T.Z. Rysbekov, Rector
Western Kazakhstan State University

The social role of science in Kazakhstan today represents both remnants of the Soviet past and a certain breakthrough into the realities of the market economy – as it has been brought to the country through globalization processes.

After attaining in 1991 sovereignty and independence, the Republic of Kazakhstan faced the problems of transition imposed by the deliquescence of most of the structures that gave sense to the model of socio-economic and political life that had been prevailing until then. The Republic was no longer an integral part of a great power, the USSR; in the region, moreover, similar processes of division were happening – with heavy consequences on the development of scientific activities. Furthermore, from the Soviet division of labour among the states making the Union, Kazakhstani science had inherited specialisation in agriculture, the humanities and social sciences only.

Other legacy of the Soviet Union: scientists were divided into two groups. The first was developing the

'humanitarian' fields of science – in fact offering scientific substantiation to the Communist Party decisions and to the policies of the USSR. Intellectual efforts in this area had to be based on Marxist perspectives, i.e., on approaches structured by economic determinism and class struggle. Any deviation from Marxist clichés was proclaimed to be 'pseudo-science', 'bourgeois science' or simple 'falsification'. Because of these narrow premises in the social and humanitarian fields, Soviet science actually failed to account for such phenomena as mental development, social psychology or the influence of biological factors on human life.

The second group of scientists consisted of the specialists in Mathematics, Natural and Technical Sciences. They were asked to cater for the speedy socio-economic development of the Union and they enjoyed a certain independence of thought – that, for instance, allowed the country to achieve success in astronautics or nuclear armament. This potential for innovation in natural and technical sciences, however, could not mask the political failures engineered by the strong wish of distant leaders to shape the future at their own will.

The Soviet funding of research programmes depended of the state budget. Yet, the sluggish administrative machinery of the time proved unable to coordinate and control the efficiency of scientific research programmes done in numerous specialised institutes that were required to tackle mainly applied tasks of economic and technological development.

In that context, however, research work was considered to be a rather prestigious occupation since, with an academic degree of Candidate or Doctor of Sciences, a scientist could receive a comfortable salary and become part of the highly respected intelligentsia of the Union.

When the Soviet Union disintegrated, the system collapsed. State financing of research programmes was drastically cut. Because of the socio-economic crisis and of inflation, salaries of both research workers and university instructors fell to levels lower than the minimum subsistence wage. As a result, scientists were driven to look for jobs in business or government service; some also decided to leave and they emigrated to countries where their talents could be used better than in the post-soviet era. Thus began the process of 'brain drain' that weakened science in countries of the former USSR.

If economic development and the prosperity of the people are the real aims of state policy – rather than making up the future through ideological decisions –, then the concentration on two or three lines of very specialised research at the expense of other relevant activities is difficult to account for in the population of a democratic country that is being asked to support concentration, right or wrong. The alternative here was the switch over to the intensive path of science development while searching at the same time for increased internal resources.

In the fifties of last century, in the USA and some European countries, important research programmes had been launched in sociology, psychology and other areas important for the development of science as a social institution. Entering a similar path in former Soviet Republics did mean a cultural mutation.

When considering the social aspects of science, one touches questions linked to the sociology of science – very much the field illustrated by the speakers at the Bologna meeting, people like Ulrike Felt of Michael Gibbons. In connection with the formation of their field of study – that looks at science as a separate field of knowledge –, they certainly refer to the work of one

the most prominent sociologist of the 20th century – Robert King Merton who defined the imperatives of the science ethos, those determining the standard component parts of any scientific community. Merton points to four such imperatives: universalism, collectivism, organised scepticism and unselfishness.

Universalism emphasises the non-personal character of scientific knowledge. Scientific theses must be true anywhere. Universalism proclaims the equal rights of people, irrespective of their nationality or race, to be engaged in science and to make a scientific career.

Collectivism presupposes that scientific discoveries are the product of cooperation and, as such, that they represent a public good.

Unselfishness presupposes that scientists act as if they had no other interest but one – establishing the truth. This imperative is the highest expression of the 'academic freedom' to which any true scientist is dedicated.

Organised scepticism excludes the possibility of uncritical reception. Any scientist must call everything in question, and this attitude of doubt creates an atmosphere of responsibility that institutionally strengthens the honesty of scientists as representatives of a given profession.

Merton's conceptual frame of the scientific ethos has stood the test of time and has become the basic frame of reference for the young and independent science of Kazakhstan.

Social aspects of science development are also interesting when seen as concepts born out of public awareness. The resulting image of the scientist embodies the system of relations that link science and society. In this regard, the sociological research carried out by the Russian psychologist K. Volodarskaya is most interesting. She has been studying that image by singling out its

cognitive, social, individual and personal characteristics. And the result is rather depressing.

Although she defines as 'admiration' the society's positive appraisal of the scientist, she considers that the psychological characteristics of today's scientist as seen by the public are encapsulated in notions such as 'helplessness, 'irresponsibility' or 'contempt'. When these characteristics are interconnected to describe the prospects of science as understood by the supporting community, there is indeed a need to stimulate the public's feelings of optimism when dwelling on their understanding of science. As a consequence, the usual policies taken up to counteract scientific decline – 'added value', 'business' or 'emigration' strategies – are *irrelevant* since they are rarely based on the endogenous needs of the people – a fact that explains that the scientist's social status still tends to reflect prejudices such as 'poverty', 'isolation from real life', and 'ivory tower living'…

Thus, there is a tension between the intellectual potential and the contents of the professional activity of the scientists – that are positively valued – and their psychological characteristics and social position – that are negatively described.

The bridging of this gap in understanding depends on the many changes affecting our transition societies. Indeed, in a very short historical period, while strengthening newly created market institutions and integrating actively the world community, the Republic of Kazakhstan has attained significant economic growth and achieved recognition as a market-based state.

Though gradually, but with a strong sense of purpose and continuity, political reforms have induced the modernisation of Kazakhstani politics, and reached a level of irreversibility as far as the many liberal and democratic changes carried out in the country are concerned.

Demand for sustainable, continued and dynamic development – parallel to the deeper integration of the country into the world community – made necessary the transformation of the whole system of research and educational institutions. At present, this system is asked to be mobile and flexible, able to give adequate replies to today's realities while taking account of the economic and political needs of endogenous development.

The transformation of the State status of the National Academy of Sciences now turned into a public agency represents one of the concrete steps taken to reform the system of research and educational institutions along lines of relevance and flexibility.

Research and educational workers of Kazakhstan are now engaged in fundamental and applied sciences after setting aside long-held utopian ideas about the ways to disclose the mysteries of nature and of being. Today, scientists join in clusters of shared interests to proceed from the material and technical base of science, making the best of the potential of existing human resources to meet the real needs of society through the development of fundamental science. This means that applied science is also reflecting a close integration with politics and business.

One of the characteristic features of science development in Kazakhstan remains its concentration in scientific research institutes - but also in universities: and that is new. In universities, science develops at two levels - teaching and research – both activities being closely interrelated, very much as they have been in classical universities in Europe.

The balance of university functions has been changing with the development of Kazakhstani society, universities keeping multifunctional roles: they train highly educated specialists, disseminate universal knowledge and moral values, socialise the younger genera-

tion and develop fundamental as well as applied sciences. What is the best mix of such functions – their relative weight – to meet the knowledge tasks imposed by modern living? What should then be a university – seen as a social establishment in a market-based economy – when it also takes into account the internal struggle that is now opposing its different roles?

Will not the universities of Kazakhstan lose positive distinctive features when joining the world educational and scientific community, for instance by adapting to its standards and technologies? How to find a balance between the market competition – a university imperative - and the necessity to solve general social tasks or to ensure the dissemination of the main components of classical culture – that are other university imperatives which go beyond economic competition? These are important questions for the research and educational workers of Kazakhstan and other countries in 'transition' – not to speak of the western universities themselves since, when combining their various activities, they have not reached a state of equilibrium either.

To move from theory to practice, the situation can be illustrated by the example of the West Kazakhstan State University as it reflects the socio-economic, political and cultural changes that are taking place in the country. As a state institution, it receives allocations mainly for education – not for research, if one excepts a few scarce grants. That is why the university strives to expand the channels of financing supporting research programmes.

There is a large oil and gas condensate field in our region, at Karagachanak, with links to trans-national companies such as 'British Gas, 'Agip' and others, all such firms being integrated into a single company, the 'Karachaganak Petroleum b.v'.

This large joint company maintains regular contacts with our university in order to carry out research work and to analyse the potential for biological re-cultivation of the area adjoining the Karachaganak oil and gas condensate field. Collaboration started in 1999 with analyses of land pollution in the area. Later work focused on the complex measures needed to restore the fertility of disturbed soils up to the level of arable land. The idea is to speed up the processes of self-purification from technology induced pollution with the help of natural factors: climatic, agro-biological and landscape-geochemical. Beside this, our researchers and scientists won tenders from the 'Karachaganak Petroleum Operating b.v.' in five more areas of scientific interest.

Our university also co-operates with the western Kazakhstan technological park 'Algorithm' where it does work on a project about 'Atmosphere moisture-conditioning instillation'. It should be noted, however, that the setting up of technological parks in Kazakhstan is a new thing and that the mechanisms for their financing are not completely settled yet – all the more so as businessmen in Kazakhstan are not very interested in investing in science.

So much for increasing the research component of our activities. From a wider point of view, however, what should be the interdependence between the scientific community and socio-political institutions – in a country that has recently passed to democratic forms of organisation?

In the early 1990s, scientific policy was formed without taking due account of social interests. Later, this legacy of the Soviet past was reduced by virtue of the multi-party system, by separating the various branches of state power and by the formation of a civil society. In this complex new set of political arrangements, academics were asked to contribute to political

campaigns, local and national elections as image-makers, speech-writers, psychologists, sociologists or political scientists – thus giving a great visibility to the humanities and social sciences. However, this involvement in the life of our community was unsystematic and the rules for its rewarding unclear – even if, as a result of this political presence, five representatives of our university became deputies on city and regional parliaments in 2003. Such a fact points to new forms of engagement where scientists are no longer a distant caste nor the obedient slaves of the totalitarian state machine. Such a changed status for the scientific profession should lead to a more favourable image of science and of the scientists based on professional know-how, independence and quality assessment. This mutation towards pro-active responsibilities should now translate into wages high enough to ensure among scientific and research workers strong motivation and a full sense of their potential career – a career leading to clear scientific results able to interest society.

Much remains to be done but the first steps that have been made already point to a new balance between research and education in Kazakstani universities and to correlated changes in the social status of the scientist, as a person and as a member of the civil society.

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