Developing the Doctorate



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Abstract

In order to develop as a knowledge-based society, Europe needs to train creative workers to meet new demands in all sectors of the economy and society. The skills required are gained through an experience of research. This leads to the development of a new concept of the doctorate. The core of the doctorate is a professional experience acquired through the management of an original research project in a high quality scientific environment. This should be reinforced by a personalised training plan in order to bring to fruition a professional project and to formalise transferable and specific skills. Universities need to develop doctoral policies in order to implement this new concept of doctorate. Structured doctoral programmes, based around a scientific critical mass, represent an operational response to the implementation of these policies.

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1. Introduction

EUA doctoral programmes project

This article is based on the recommendations formulated through the Doctoral Programmes Project organised by EUA in 2004-2005 with the support of the European Commission. This project, managed by six networks of 49 European universities, and involving two conferences, concluded with a report "Doctoral Programmes for the European Knowledge Society" (European University Association, 2005). The article also builds on the discussions developed continuously since then in different European seminars and workshops organized by EUA.

Early stage researchers

This article is also designed to reflect the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers (European Commission, 2005), which European universities are encouraged to ratify and implement. Consequently, the term "early stage researchers" (ESRs) will be used to designate doctoral candidates "in the first four years (full-time equivalent) of their research activity, including the period of research training." (European Commission, 2005, p.28).

2. A new perspective for the doctorate

Doctoral training on the agenda

In the context of the Bologna process, doctoral training has recently gained greater importance on the European higher education and research agenda. Changes in research practices and, more widely, within European societies have led to the need to adapt doctoral systems to meet the new challenges of a knowledge-based society, a global labour market of highly-qualified professionals, and the new profiles and demands of doctoral candidates.

There has been a steady increase in the number of doctoral students trained throughout Europe during the last two decades, although this increase has been unevenly spread across discipline groups and countries. This increasing number of ESRs in research groups has led to a noticeable growth in their contribution to the production of knowledge and innovation, and makes them a part of the research process. It also represents a first response to the need to expand the number of researchers and research-related careers in Europe, as called for by the ambitious Lisbon objectives. This expansion can only be achieved by an adequate and sustainable implementation by member states and EU policies.

Are universities producing too many PhDs?

Even so, the number of PhDs entering the labour market in some areas exceeds the most optimistic estimates of Europe's needs in researchers. Therefore, this begs the question whether European universities are training too many PhD students. The answer is two-fold: if universities still offer programmes based on the traditional apprenticeship model and see the doctorate as mere training *for* research, then the answer has to be "Yes". If however the doctorate is seen as training *through* research in order to meet the needs of a knowledge-based society in creative workers, then the answer is "No".

The challenge for universities

The point is not that too many PhDs are trained in Europe, but rather that there is not enough awareness among recruiters, policy makers, economic leaders, academics and students about the added value that an experience of research has for the creative development of professional sectors, other than those directly related to research. And herein lies the challenge for universities: to accept this new concept of the doctorate as an opportunity and a resource, as a window on all sectors of economy and society and, as a result, to be seen themselves as a major actor in the development of the European knowledge society.

Not just the first step in a research career…

Basically, the doctorate should not be considered solely as the first step in a research career, but rather as a unique experience that produces professionals capable of acting and deciding within complex environments involving numerous parameters, interests and people.

Transferable skills

All the skills gained by doctoral students during their training through research deal with the management of complexity and uncertainty, and with the ability to find suitable solutions to new problems. Obviously, such skills are beneficial to most sectors of the economy and society. Companies, administrations, governments, organisations are regularly confronted with problems that cannot be solved by tried and tested solutions based on a simplification of reality. There is an urgent need for professionals capable of coming up with innovative approaches, and therefore, for new professions. The experience of running a research project makes PhD holders good candidates to meet such needs.

The career prospects for PhD holders outside the research sector should thus be seen as very attractive. Rather than being considered a poor second choice for those who have failed in research, such options should be seen as part of an informed and valid career plan.

Transferable skills and qualities of an early stage researcher

The following list of skills is not exhaustive. Its purpose is to illustrate the diversity of skills that one develops during training through research. ESRs do not automatically acquire all these skills. Skills acquisition depends on several parameters: the specific professional environment, the doctoral research project, the researcher's personal qualities and motivation. It is therefore important to involve ESRs in reflecting on their own experience, motivation, skills and abilities, in order to guide them in their professional project.

Skills:

- To build and lead networks and teams
- To manage time and material/human/financial resources
- To face the unknown, uncertainty
- To solve complex problems by setting up new technical tools or methods
- To find, extract, organise and synthesize information quickly from a variety of sources, whether plentiful or inadequate
- To manage failure and bounce back
- To improve upon standard models and approaches
- To develop innovative solutions by combining different original strategies
- To anticipate changes and problems
- To stand back from an environment and look at it with a fresh eye
- To set up rational implementation plans in order to bring new ideas to fruition
- To acquire new skills and knowledge quickly
- To monitor technological development
- To write and present scientific and technical documents (scientific papers, summaries, reports, figures, graphics, etc.)
- To communicate through different information media for different audiences

Qualities:

- Capacity for endurance, boldness, tenacity, rigour
- Adaptability and intellectual flexibility
- Versatility
- Autonomy
- Curiosity

Handout C 4.4-2-1 Transferable skills and qualities of an early stage researcher

3. A new concept of the doctorate

A professional experience….

This new perspective views the core of the doctorate as a professional experience acquired through the management of an original research project.

As such, the doctorate differs qualitatively from the bachelor and master degrees, as its training dimension is akin to professional experience. This training is therefore given as a whole, performed over a limited period of time as a project, and cannot be divided up into "small units".

The doctorate and ECTS

Training through research is a three to four year professional experience of an original research project. A doctoral degree is awarded following assessment of the research project, as a whole, based on a thesis and on the defence of this thesis before a panel of experts. Not all elements of this process can be easily reflected using ECTS.

Since the doctorate is mainly a professional research experience, exams and grades can often be seen as less important. The part of the doctorate dedicated to training activity is based on the proactive participation of ESRs in seminars and workshops chosen according to their own personal and professional projects.

However, ECTS or ECTS compatible systems are already being used in a number of universities for generic and skills training courses, since these fit into doctoral or graduate programmes and support both the development and mobility of doctoral students. Mobility can also be encouraged through research projects involving European partnerships between universities and/or research units, and through joint doctoral degrees.

Handout C 4.4-2-2 The doctorate and ECTS

… through managing an original research project

As a professional experience, the doctorate should encompass not only scientific knowledge and technical skills, but also generic skills (team work, networking, time management, autonomy, etc.) and more specific skills attached to research activity (management of uncertainty and failure, ability to convince others of the relevance of a hypothesis, life long learning, etc.).

These skills are acquired through the doctoral experience and represent the added-value of training through research. Nevertheless, ESRs need to be aware of these skills and able to sell them to future employers. This also implies a good knowledge of job market mechanisms and some reflection on one's own professional development.

Not simply a continuation of academic studies

The doctorate can no longer be considered merely as a continuation of academic studies (i.e. an essentially "non-productive" process), or as a personal accomplishment or opus within an exclusive mentor-disciple relationship. Indeed, such a concept no longer corresponds to the daily reality of most ESRs, who are already greatly contributing to scientific production and who should therefore be considered as researchers, according to the European Charter of Researchers.

4. Implementation of this new concept

Major practical consequences

This conceptual shift towards a doctorate conceived and promoted as a professional experience has major practical consequences. These include:

- Structured doctoral programmes
- Well-defined doctoral projects
- Recruitment and funding of early-stage researchers
- Supervision of doctoral projects
- Career guidance for the ESRs as an integral part of a doctoral project.

4.1 Structured doctoral programmes

The major aim of doctoral studies is to train the future researchers, teachers, executive managers and decision makers of the European knowledge society. Successful completion should be acknowledged by a doctoral degree designated "Doctorate" and awarded at the highest institutional level.

No unique structure

The objective of the Bologna process is not uniformity but harmonisation achieved through different routes within a common framework. Therefore, no recommendation for a unique form of structure for doctoral programmes is needed. It could be graduate schools (e.g. as in the UK, which include one pre-doctoral year), doctoral schools (e.g. in France, where the pre-doctoral year is included at master rather than doctoral level), doctoral programmes (with or without this pre-doctoral year) at Faculty or University level… Whatever the structure, the organisation should meet the same goals and key issues as put forward by EUA's Doctoral Programme Project, and adopted in the Bergen Communiqué (2005).

Collective dimension of research

Firstly, a structured doctoral programme is defined as providing a high-quality research environment ensured by a critical mass of strong research groups or communities as a source of input and support. Differences exist between disciplines regarding the process of the production of scientific knowledge, based on different strategies and approaches (experiments, observations, surveys and case reports, library work, archive investigations, etc.). Setting aside these differences, the collective dimension of research, leading to its structuring, is a keystone for its efficiency. Embedding ESRs in scientific communities, labs, teams, or in regular seminar series, where they and their senior colleagues exchange experience, knowledge, confront hypotheses and discuss results, is an important condition in ensuring high quality doctorates. On the other hand, the implementation of doctoral programmes helps to structure research in fields where this collective dimension is not yet a reality. In such cases, the doctorate can be an important lever for the university in implementing research policy and encouraging good practice.

Several ancillary processes

This definition implies the implementation of several ancillary processes, led by the doctoral programme in coordination with the research groups: recruitment of ESRs, funding and supervision of the doctoral projects, development of ESR professional projects and career development. For each step of a doctoral project, objective quality criteria have to be discussed and defined, in the context of the overall quality goals. These embed the doctoral programme in a continuous improvement process, and facilitate the management of the doctoral programme. It is worth underlining here that transparency is a necessary condition for the success of any quality approach.

Two-phase training

Secondly, a structured doctoral programme has a two-phase training. In the first phase, it enhances scientific knowledge in the field of the doctoral project and/or it expands knowledge where it connects with other disciplines and societal challenges. This happens at doctorate-level courses, seminars and workshops. In the second phase, it provides tools for the ESRs professional plan, by making them aware of the specific and generic skills they are developing, and by informing them about the job market and employment opportunities. This training cannot be given through traditional lectures, but rather through dynamic training methods that are strongly based on the active involvement of ESRs, e.g. using workshops in small groups.

In this way, a doctoral project is established as a partnership linking the candidate, his/her direct supervisor(s), the doctoral programme and the institution. Thus, the mission of the doctoral programme (provision of training, overall follow-up of the procedures, etc.) should be addressed by each of these partners.

4.2 Doctoral project

Defining the doctoral project

To achieve high scientific quality, good integration within research groups and recognition of the doctoral experience on the job market, particular attention needs to be paid to defining the doctoral project.

Whatever the scientific context, a doctoral project should include:

- An **innovative** research question:
  - **Integrated in the scientific policy** and objectives of the research proposal. This condition is necessary if the candidate is to obtain resources and support through fruitful interaction with his/her future colleagues;
  - Whose **feasibility** matches the doctoral requirements (i.e. a 3-4 year project entrusted to a junior professional). This feasibility can be demonstrated by describing current thinking, the previous work of the research group, a provisional timetable for the project, the expected or possible results, and how the results will be disseminated. It has to be kept in mind that a doctoral project is not the "scientific opus of a lifetime", nor a mere technical training period restricting the ESR to a role of "scientific data producer" (collecting data in the field or repeating the same experiments) without significant contribution to the critical analysis of the results obtained;
- A set of **technical and financial resources** to ensure work progress (experimental materials, computing means, access to research resources such as archives or large scientific installations, field trips or conferences, etc.);
- The **full-time funding of the candidate** throughout the project (see 4.4 Funding);
- A **senior researcher** for the overall supervision of the project (see 4.5 Supervision);
- The **profile required** for potential candidates (scientific background, required skills and aptitudes, etc.).

Handout C 4.4-2-3 What should be included in the doctoral project?

The drawing up of the doctoral project involves both the candidate and the supervisor(s) responsible within the doctoral programme. Indeed, the supervisor(s) and their research groups know the state of the art in their scientific field and what research questions could be explored. They also have the necessary experience to plan a 3-4 year project properly. This should not prevent the candidate from contributing to the drafting of the doctoral project, but rather serves to emphasise the responsibility of the supervisor. At an early stage in the project, candidates should be encouraged to examine the project and propose their own ideas and strategies.

The institution running the doctoral programme has to ascertain the quality of the doctoral projects proposed. It is its responsibility to accept or call for modifications of a doctoral project if it does not match the quality criteria collectively drawn up at doctoral programme level.

Good practice recommendations for the definition of the doctoral project:

For doctoral programmes: It is good practice for a doctoral programme to write and advertise its own guidelines for the definition and acceptance of doctoral projects proposed by affiliated research groups.

For funding agencies: The success of a doctoral project depends on the funding of a research project, a research group and an ESR. Even if the agency only funds candidates, it should ascertain that the work will be carried out in a funded research group. This implies that communication about funding should also be directed towards institutions (universities, doctoral programmes, research labs) and not only to potential candidates. Accordingly, application forms should also be targeted at potential supervisors, through doctoral programmes.

Handout C 4.4-2-4 Good practice recommendations for the definition of the doctoral project

4.3 Recruitment

In accordance with the Code of Conduct for the Recruitment of Researchers, "candidates should be informed, prior to the selection, about the recruitment process and the selection criteria, […]. They should also be informed after the selection process about the strengths and weaknesses of their applications." (European Commission, 2005, p. 25)

This should be ensured through wide dissemination of the proposed doctoral projects. Web sites of universities and/or doctoral programmes should communicate these recruitment campaigns, providing all the necessary information to candidates, including the selection criteria.

Professional recruitment standards

The enrolment of candidates on a doctoral project should be considered as recruitment, and treated as such. The doctoral project proposed should first be validated by the doctoral programme. The choice of candidates should follow clear and transparent procedures, both at doctoral programme level and at research group level. Face-to-face interview(s) between the candidates and the supervisor and the research group, under the responsibility of the doctoral programme, is the best way to evaluate the candidates' quality and motives, and to present the context of the doctoral project. For the candidates, a face-to-face interview is the opportunity to ask about the research group projects and partners, the working conditions, the professional careers undertaken by previous ESRs trained in the group, etc. For both the candidate and for the research group, it is the opportunity to agree on the respective rights and duties, the work load, the supervision processes, and the expected results, according to the rules specified by the doctoral programme and the institution.

The professional plans of the candidates after the doctorate must also be discussed and the training opportunities offered by the doctoral programme should be presented to the candidate.

Selection criteria

The selection criteria should focus as much on the candidates' potential creativity as on their previous academic records, by taking into account personality, maturity, skills, motives, interest for the research field, and professional project.

As for defining the doctoral project, responsibilities must be clearly shared between the doctoral programme and the research groups. Several models can be found but the common, essential point is a clear distribution of roles. The institution and the doctoral programme should ascertain the fairness of recruitment, the openness to external candidates, including international candidates with a (Bologna) master degree or an equivalent training, and to address questions such as: how many candidates have been interviewed for each doctoral project? Where do the candidates come from? How many ESRs have been recruited by each research group and each supervisor?

4.4 Funding

Full time, fully-funded

Research is a professional, time-consuming and intensive activity. European research can not expect to reach the top of international league tables without paying close attention to researchers' working conditions. Since ESRs contribute to the production of knowledge, new tools and products during their doctoral project, their work should be considered as a full time and fully funded professional activity.

Levels of responsibility

One can highlight several responsibility levels in the funding issue:

- **Supervisors:** Supervisors of doctoral projects should find a way to fund the junior colleagues they recruit. The home institution of the doctoral programme should be in a position to help them in this task by providing good information about the existing funding systems.

- **Institutions and doctoral programmes:** In the same manner as for recruitment, institutions should establish, advertise and monitor rules concerning the funding of ESRs enrolled in their doctoral programmes. These rules should be clearly recorded in a code of practice, a charter or some similar document. A contract should be signed between the ESR, the institution and the funding agency.

- **Funding agencies:** Such agencies, whether public or private, should favour funding systems that cover the whole doctoral project, with appointment levels high enough to be attractive for good candidates with adequate social security provisions, including

sickness and parental benefits, pension rights and unemployment benefits in accordance with existing national legislation (see the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers, 2005, p. 18).

- **Government bodies and Ministries responsible for research:** These public authorities should ensure that the necessary funding opportunities exist in all scientific fields in order to implement national research policy. Public funding and incentive mechanisms are especially necessary in scientific fields where private funding is still less developed.

Part-time

Part-time doctorates can be justified when the ESR is already involved in a high-level professional activity before starting a doctoral project. Such cases should be limited to candidates for which a doctoral experience can be justified as a step forward in a professional career. These doctorates can be considered as a way to acquire skills and a professional experience of research to boost a career. The core of such doctorates must be the same as full time ones: running an original research project following a fixed timetable.

4.5 Supervision

Shared responsibility

In this new view of doctorate, supervision should no longer be a (sometimes elusive) burden for an isolated supervisor. On the contrary, the responsibility is shared by different partners involved in the doctorate with the ESR: the supervisor(s) of the research project, the doctoral programme and the institution.

The supervisor is responsible for monitoring the doctoral research project and for assisting in drawing up the ESR's professional project. An experienced researcher, he/she also should act as a project manager and a coach. Scientific excellence, though a prerequisite, does not necessarily guarantee that a researcher will make a good supervisor. Supervising a doctoral project is no easy task: it requires availability and rigour, an open mind and an attentive ear, competences in project start-up and fundraising, etc.

Training

The role of a supervisor is complex and, as for all professional activities, training is essential. The training of supervisors should be provided by the institution. In some countries, a researcher must be duly accredited by an institution in order to be allowed to supervise doctoral candidates. This accreditation, based on the validation of supervisory skills through a successful supervision experience, should be coupled with awareness-raising programmes about project management, human resources management, the labour market, etc.

Role of institutions

During the process of supervision, the supervisor should be backed by the doctoral programme and by the institution. The roles of institutions are thus:

- **To monitor the progress of the research project**. Different means have been developed in various countries and universities: an additional supervisor, an external tutor, a mid-term committee, regular team seminars, technical means such as web logs or electronic portfolios, etc. All of these solutions involve adding an external resource in the relationship between the two main stakeholders of a doctoral project, and the definition of some milestones throughout the life of the project.

- **To ensure that the supervisor's workload is coherent with his/her responsibilities towards the ESR.** The question of the maximum number of doctoral projects that a researcher can reasonably supervise must be addressed by the doctoral programme. At present, practice within Europe and even within each country is too diverse. This needs to be discussed, fixed and published by each university. Moreover, this number tends to increase over time. When national administrations are responsible for the accreditation of doctoral programmes, they should take into account, amongst other evaluation criteria, this number, and/or its increase.

- **To ensure that supervision is acknowledged** as part of the varied job description of a researcher, and to offer a training plan to support this.

- **To provide training for ESRs on generic transferable skills and to follow up ESR professional projects** (see 4.6 below).

Appeals procedures

The rights and duties of each partner are generally specified in a charter, a code of practice or a contract, which should comply with the European Charter for Researchers. When these rights and duties are not regulated by a legal contract, the doctoral programme (and, therefore, the university) is responsible for the correct application of the Charter. It means that appeals procedures should be established under the control of the doctoral programme and of the university, in conformity with the recommendations of the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers (see European Commission, 2005, p.22).

4.6 Training

By its very nature, a doctoral project is a temporary activity. During this time, the ESR needs to develop his/her own professional plan. Supervisors should support and facilitate the preparation by the ESR, during the doctorate, of his/her own professional future. Doctoral programmes should offer training which supports the ESR in building his/her own training plan.

Training objective

The objective of this training is to make the ESR more aware of his/her skills and motivation and of job opportunities within research-related careers, and indeed more widely as a creative worker in any sector of a knowledge-based economy and society. Through pro-active preparation, this will allow each ESR to build a career path that matches his/her aspirations, qualifications, and labour market realities.

A balanced training offer should include:

- Training in transversal professional practices, such as team and project management, institutional and inter-personal communication, law;
- Training in career management: developing a professional project, personal skills, job-seeking techniques, labour market and business world knowledge;
- Training on more specific technical subjects: intellectual property rights, monitoring technological development, innovation management.

Involving the ESRs

To make this offer attractive and effective, it is important to develop training activities based on the active involvement of ESRs, and on the exchange and sharing of information from various cultures and scientific fields.

Doctoral programmes need to make ESRs and their supervisors aware of the importance of such training. Participation in training sessions can be encouraged in various ways, such as disseminating the experience of previous trainees, developing joint activities with ESR groups, the effective communication of training possibilities, involving the supervisors, etc.

Pooling resources

As these issues transcend disciplinary borders, training actions can be combined between doctoral programmes or between universities. Pooling these resources can ensure critical mass in terms of dedicated full-time staff and financial means. An example of such an effective approach was a European summer school organised on generic skills for ESRs, organised by the EUA Doctoral Programme Project network in Granada in 2005. There is scope for many such European initia-

tives. The European Commission should consider offering support for such measures, possibly through a mechanism complementary to the research-based Marie Curie Programme.

4.7 Career paths

Monitoring graduates

Monitoring the quality of the training provided implies that institutions and doctoral programmes are able to gather information on the career paths of their PhD graduates. This monitoring should be based on indicators such as unemployment rates, average time to employment, distribution across socio-economic sectors and functions, international and inter-sectoral mobility, etc. The difficulty often lies in the tracking of PhD graduates. They often stay in touch with their former colleagues and with the supervisor, but without gathering global data at the doctoral programme level, no relevant statistical analysis is possible. Alumni associations could be useful partners for universities in tracking the careers of the doctoral graduates.

4.8 Mobility

The report on the EUA Doctoral Programmes Project addressed this issue widely:

“Supporting mobility can enhance contacts and collaboration between research groups and facilitate joint research and doctoral programmes of high quality.” (European University Association, 2005, p.27).

Mobility already takes various forms: research networks, joint doctoral degrees, European doctoral programmes, doctoral summer schools, etc. Successful mobility is based on close and well-organised inter-institutional and international collaboration.

Mobility should be discussed and organised at the beginning of a doctoral project between the partners, especially if it is to be integrated in the professional project of the early-stage researcher.

5. Continuous quality improvement

Promoting quality culture in European universities is one of the challenges for the emerging European Higher Education and Research Areas. Quality is not self-evident but has to be built step by step. All staff must be involved and some tools are required to implement quality procedures.

Quality culture and institutional mission

"On a strategic level, developing a quality culture should be strongly linked to the institutional mission. The institution has to find ways to promote its mission via its structures and procedures. To do so, the organisational structures and procedures should provide incentives to its members for behaviour that conforms to institutional mission and goals." (European University Association, 2004, p. 12)

Quality management

For doctoral programmes as for many other structures in universities, quality management is still a little-known approach. However, quality management can constitute a powerful framework to implement the recommendations previously described. Implementing quality issues begins a dynamic process of continuous improvement of the way the missions dedicated to doctoral programmes are fulfilled.

Doctoral programmes have to monitor a number of processes and procedures. A bureaucratic implementation of these can meet with stakeholder resistance. However, if the processes and procedures are embedded in a quality improvement dynamic, implying a collective approach, this might facilitate changes in the stakeholders' attitudes.

Cyclical work process

In practical terms, doctoral programmes should implement a cyclical work process based on the following steps[1]:

- To initiate a general discussion about the mission, involving research groups, supervisors, ESRs, administrative staff, and then agree on decisions.
- To discuss and agree concrete and realistic goals with built-in deadlines. To define quantitative and qualitative indicators in order to measure the expected results.
- To discuss and agree the activities to be implemented, the roles of each stakeholder, and the necessary technical/financial/human resources and formal procedures.
- To monitor the activities while in progress.
- To check the results against the initial goals, thanks to the indicators.
- To plan corrective measures.

Information systems

This model implies that reliable information and communication systems are in place to gather and process data, and to distribute information. Without efficient information systems, it is impossible to de-

[1] This model is inspired by the Plan/Do/Check/Act cycle, developed in many quality systems.

fine indicators, to monitor the processes and procedures, and finally to measure quality. As long as information systems within universities are only conceived as administrative databases, quality will remain an empty word.

National ministries in charge of research and higher education should support the development of quality systems within universities. The recommended approach is to allocate resources to those universities which implement quality assurance procedures and promote transparency, whatever their current results. In this way, a focus can be encouraged on improvement and enhancement, and benchmarking and comparison between universities can be developed. Such an approach can help develop European Higher Education and Research Areas which are both visible and credible.

Bibliography

Bergen Communiqué (2005), *The European Higher Education Area – Achieving the Goals*: Communiqué of the Conference of European Ministers Responsible for Higher Education, Bergen: May 19-20, 2005

European Commission (2005), *European Charter for Researchers and a Code of Conduct for the Recruitment of Researchers*, http://europa.eu.int/eracareers/pdf/am509774CEE_EN_E4.pdf

European University Association (2005), *Doctoral Programmes for the European Knowledge Society*, http://www.eua.be/eua/jsp/en/upload/Doctoral_Programmes_Project_Report.1129278878120.pdf

European University Association (2004), *Developing an Internal Quality Culture in European Universities*, http://www.eua.be/eua/jsp/en/upload/QCII%20Report%2030.03.05.1115967574238.pdf

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