

## **Education, Research and Innovation**

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**Research and Innovation for Education and Education for Research and Innovation**, *Gabriela Florescu, (National Institute for Research and Development in Informatics, Romania)*

**Tuning tools and insights for modern competence-based third-cycle programmes, Prof. Ann Katherine Isaacs (University of Pisa, Italy)**

The paper looks at the tools useful for the third cycle that have been created by the many Tuning projects carried out over the last 13 years. The Tuning Process has proceeded in parallel with the Bologna Process and consists of a number of University-driven projects, following a common methodology, to create positive and concrete ways of implementing the shift to competence-based learner-centered higher education programs and practices. At present nearly all continents and macro-regions (Europe, Latin America, United States, Canada, Australia, Central Asia, Russian Federation, China and more) have participated or are participating in Tuning. The Tuning methodology has been applied to third cycle studies, both overall and in many key subject areas. Here we give an overview of how the tools and understandings created can enhance third cycle programs in any disciplinary area, including the arts and music.

**Doctoral programs: a bridge between higher education and research, Nicola Vittorio (University of Rome Tor Vergata)**

Doctoral programs are the bridges between the realm of higher education and the realm of research. When looking at the main reform initiatives in Europe, the building of the European Higher Education Area and the reinforcement of the European Research Area, European policy makers at all level should pay attention at their synergies and complementarities.

The main focus of Doctoral programme, being the development of new scientific knowledge by training to research through research, is more and more complemented by a stronger attention on how to empower the next generation of researchers for the knowledge society, where research&development and research&innovation are the basic ingredients for a inclusive and sustainable society. Along these lines, profiling and assessing a Doctoral program have been object of careful and deep discussion in Europe in the past 15 years.

However, the implementation of any reform on Doctoral training has to take place at the institutional level, where programs are developed. In this sense, several guiding initiatives have been put forward and endorsed at the political level, such as the Recommendations of Salzburg (EUA), the Chart and Code for Researchers and the Principles for Innovative Doctoral Training (European Commission), the Recommendations of the Berlin and subsequent meetings (EHEA Ministers). Before developing new initiatives for reforms, the implementation of these recommendations should be carefully monitored and assessed.

The purpose of this paper is to present the mapping exercise of the current situation inside the EHEA, as elaborated by the BFUG ad hoc working group on the III cycle, with a specific focus on the Italian reform in Doctoral training. It includes the description of quality assurance procedures, the set-up of doctoral schools, the internationalization of the doctoral programs, and the interactions with the non-academic world, both public and private.

The paper will also be an opportunity to discuss some of the recommendations to implement quality, transparency, employability and mobility, as required by the Ministerial Conference of Bucharest in 2012.

**Enhancing the quality of research in Europe: theoretical perspectives and guiding principles for researcher development, Professor Linda Evans (University of Leeds, United Kingdom)**

Since 2003 doctoral education has become a key feature within the remit of the Bologna Process. Perceived as a crucial link between the European Higher Education Area (EHEA) and the European research area (ERA) it is identified as the cornerstone upon which will be built Europe's future world class research excellence. Yet consideration of how European doctoral education may be developed – including the ten principles to emerge out of the 2005 Salzburg seminar, and the *Principles for Innovative Doctoral Training* that were published in 2011 – largely ignores issues related to the quality of doctoral research. This paper focuses upon how 'the new academic generation may be trained to become creative, critical and autonomous intellectual risk takers, pushing the boundaries of frontier research'. It draws upon the author's original theoretical models and discusses ways in which these may be applied practically to develop early career European researchers working for their doctorates and at post-doctoral level. The overarching message is that whilst structures and systems may support researchers during and after their doctoral programmes, these alone will not achieve high quality research and, by extension, high quality researchers. Doctoral training, it is argued, must incorporate consideration of how researcher development occurs, and the paper presents the author's original conceptual model of researcher development and bases recommendations for policy development upon that model.

**The problems of doctoral education in Armenia within the framework of Bologna reforms, Lusine Fljyan (Yerevan "Brusov" State University of Languages and Social Sciences, Armenia)**

In this paper we have made an attempt to analyze the problems of doctoral education in Armenia regarding to Bologna reforms from a variety of perspectives:

1. overall organization of doctoral studies;
2. different actors at the policy-making level;
3. inputs (funding, quality assurance)
4. outputs (the benefits to the society).

Hence we try to examine the doctoral education of the country as a system where all the chains - the structure, the performers, the tools and the results – should be taken into account when trying to discuss the problems which hinder the efficient work of the whole system.

The organizational reforms have reflected in redesigning of curricula, implementation of ECTS credits and the use of Diploma Supplement.

The issue on qualifications is the most vulnerable one as the degrees and qualifications do not match with those that exist in European countries. The Bologna ad-hoc working group on third cycle

recommends in the draft of its final documents to clarify the qualifications in relation to Qualifications Framework of EHEA and ERA. The new national qualifications framework is under discussion by the international and local experts so as to reflect the profile and the descriptors for the degrees of Candidate of Sciences and Doctor of Sciences which are considered to be the highest qualification degrees in Armenia.

Research is an open process, and it is impossible to progress without international cooperation. The issues connected with the internationalization of doctoral programs, mobility of doctoral students, professors and supervisors, creation of joint and double degree diploma programs are also very important. Many of the EU funded projects also foster the extension of international dimension in doctoral education in Armenia.

The outflow of researchers is high, but the expectations from it are optimistic, as our specialists are involved in many serious international projects throughout the world, and in this way they extend their qualifications. To tackle the problem of brain drain we need to elaborate a national program to foster the inflow of the specialists with academic degrees by creating attractive career opportunities for them. The acquisition of transferrable skills has already fixed as a “must” in the appropriate guidelines for the elaboration and implementation of doctoral programs in the country.

We are discussing the problems of doctoral education from the perspective of various actors on policy making, operational and performing levels.

Funding of doctoral education in Armenia is carried out by the state as well as through the tuition fees by the doctoral students. The main criteria for distributing the public budget to universities is the number of free-of-charge doctoral students they have. Beginning from 2013 the Government of Armenia has established the Innovative Competitive Foundation which directs its resources to the funding of the research itself through competitive calls to the higher education institutions, research institutions and agencies.

The outputs are connected with employability and self-employability of doctoral students, diversification of career opportunities of doctoral students, and the preparation of highly qualified workforce for the national economy.

The doctoral education, which is regarded as the advancement of knowledge through original research, and the main goal of policy-makers at all levels is to make research an attractive career by continuing the realization of Bologna reforms.

**Education through research at CERN, Dr. Alexandru Nicolin (Horia Hulubei National Institute for Physics and Nuclear Engineering, Romania), Dr. Florin Buzatu (Institute for Atomic Physics, Romania)**

The Romanian PhD students who work at CERN have been included in some of the most challenging experiments worldwide and have experienced firsthand the dynamics of interdisciplinary research teams. Looking beyond the research output of the collaboration, we show that the PhD students have been effectively bridging between two academic cultures which value differently the diversity of the

research landscape, interdisciplinarity and innovation. As the goal of the newly started H2020 programme is that of shortening the distance between scientific research and industrial application, as to insure the transition to a more innovative and competitive Europe, we should broaden our research assessment framework such that we properly account for all forms of scientific output. To allow PhD student to reach their full intellectual potential we should try to complement (if not, in fact, replace) the current scientometrics evaluations with expert peer-review, as the prescriptive application of assessment standards is not fully compatible with supporting the specificities of each research field and does not catalyze creativity and innovation.

**Quality of doctoral training and employability of doctorate holders: The views of doctoral candidates and junior researchers, John Peacock (*Eurodoc, The European Council of Doctoral Candidates and Junior Researchers*), Filomena Parada (*Eurodoc, The European Council of Doctoral Candidates and Junior Researchers*)**

In the past decade, a number of issues such as the growth in the number of doctorate holders, and the inclusion of the 'third cycle' in the bologna process, contributed to transforming doctoral education in Europe (AAUP, 2009; Sursok & Smidt, 2010). The number of permanent academic or research staff has not kept pace with the growth in doctoral candidates. The doctorate can no longer be regarded as training for an academic career, and ever more doctoral candidates have to seek alternative careers.

The question then arises as to whether or not the process of completing a doctoral degree is, or can be, valuable to the non-academic sector, to society or to the individual doctorate holder (see LERU, League of European Research Universities, 2010, 2014). Doctoral training must ensure that doctorate holders are better equipped to pursue non-academic careers, that those considering pursuing a doctorate are aware of the situation and the realities of the academic career path, and that the non-academic sector understands the purpose and value of the doctorate.

These are issues of pressing concern to EURODOC, The European Council of Doctoral Candidates and Junior Researchers, which advocates for an improvement in the quality of development opportunities available to researchers. EURODOC represents both doctoral candidates (DCs), those researchers who are working towards a doctoral degree, and junior researchers (JRs), the larger group that includes all researchers who are not yet fully independent (see European Commission, 2011). EURODOC works to inform policy makers and other stakeholders of the situation facing early career researchers (ECRs).

In order to fulfil its role, EURODOC annually surveys its members to learn about the situation in different countries across Europe, and gathers other input on various issues from its members on a regular basis. In 2011, EURODOC published the results of EURODOC Survey I, a major survey of 8900 doctoral candidates across Europe (Ates, Höllander, Koltcheva, Kirstč & Parada, 2011). The survey shed light on a number of the issues mentioned above.

In this paper we will review the results of the survey, and EURODOC's other internal surveys and policy statements, with respect to these topics. We will discuss the issues this raises and make suggestions concerning:

1. The promotion of quality and the improvement of quality assurance in doctoral training and supervision;

2. How to ensure a successful transition from being a doctoral candidate to a doctorate holder. Specifically the need to ensure that doctoral training programmes enhance the competencies necessary to succeed outside academia, and that employers, especially in the non-academic sector, understand and recognise the value of the doctorate.

**Research and Innovation for Education and Education for Research and Innovation,**  
*Gabriela Florescu, (National Institute for Research and Development in Informatics, Romania)*

The paper discusses the point of view of the scientific research expert on the triad research-innovation-education in the current European context pointing out the main themes to be considered for EHEA at national level and European level.

Several critical aspects on the potentiality of current instruments used by educational sector to sustain the progress in research and innovation will be underlined. Also, the research results sustaining the high level and efficient education will be emphasized considering that concreteness of decisions in the triad is compulsory for consolidating the current future strategy implementation.

The use of the European instruments sustaining and provoking the progress of knowledge will be exemplified indicating their plus and minus in assisting a coordinated policy for efficiency in education and research. The current H2020 MSCA and its potentiality on some research areas will be constructively approached by signaling several minor but, with the time, possible dangerous weaknesses.

These observations are intended to be considered in future European activities updates in order to improve the European and national instruments sustaining the education for research and innovation. The paper will conclude with a set of recommendations based on author's experience in research, innovation and education.