

# **DOCTORAL SCHOOLS IN SERBIA: CONCEPT AND IMPLEMENTATION**

## **- outline -**

### **1. INTRODUCTION**

In respect of the quality assurance development in Europe, doctoral studies have undergone considerable reforms in almost all countries. In the early 1990s, some countries have undertaken changes in the organisational framework for doctoral studies and introduced more structured forms. Doctoral schools were established in Denmark and the Netherlands, and the German Research Foundation started to fund Research Training Groups with the specific aim of moving away from a highly individualised model based on the personal model of master–apprentice between a supervisor and a candidate. The goal was to enhance the institutional responsibility with regard to the integration of doctoral candidates in a research environment beyond the activities of their supervisors and to facilitate interdisciplinary research groups.

In that period, doctoral studies were rapidly developing. As the notion of the knowledge economy spread, the European Union launched its Lisbon Strategy to make Europe the “most competitive and dynamic knowledge-based economy in the world.” Many countries made big investments in doctoral studies. According to OECD, the annual growth rate of doctorate holders was 5% from 2000 to 2010. In Denmark, Norway and Italy, the number of doctorate holders doubled within that decade. This rapid growth, combined with increased investment in research and political attention in general, is important for understanding the context in which the reforms of doctoral studies took place in Europe.

With the introduction of the ‘third cycle’ in the Bologna Process in 2003, reforms started to be introduced in all European countries. Structured programmes with school education elements were established. In some countries, ECTS was introduced in doctoral studies. Thus the need to develop professional management of doctoral studies emerged.

In 2005, EUA published the Salzburg Principles as a response to the Bergen Communiqué of the Bologna Process, which are deemed to be the “basic principles for doctoral programmes.” The Salzburg Principles were instrumental in shaping the reforms of doctoral studies. These principles underlined the importance of research, but stated that research should be entered in institutional strategies and should contain diverse practices and programmes. These principles were additionally explained and enhanced by the 2010 Salzburg II Recommendations, which further underlined research as the basis of doctoral studies and the element that made them substantially different from the first and second cycles.

The way to achieve new quality in terms of organisation is establishing DOCTORAL SCHOOLS. The concept of a doctoral school originally covered everything, from a doctoral programme with a few doctoral candidates to organisational units at the level of an entire

university. The concept has evolved, so today it is an organizational unit oriented to overall strategic management, rather than to individual programs. Some universities have doctoral schools for each faculty; others have one doctoral school to manage all activities in doctoral studies (“umbrella model”). In any case, the establishment of doctoral schools indicates the significance of institutional engagement which represents an important complement to the basic model of the master–apprentice relationship.

The EUA Trends reports illustrate the rapid development of doctoral studies: in the 2005 Trends IV Report, most of the countries have indicated doctoral studies as an important area for reforms. The number of institutions with at least one doctoral school doubled from 2007 to 2010 (from 29% to 65% in 37 countries included in the survey). This number had risen to more than 80%, according to the survey conducted within the ARDE project. The survey shows that doctoral schools may exist at many levels and in different forms within one institution. It is necessary to differentiate doctoral programmes from doctoral schools: a doctoral programme is an organised set of taught courses and research opportunities within one or more disciplines, while a doctoral school is an institutional structure within a higher education institution with its own resources dedicated to management of doctoral studies. Detailed analysis shows that there are two basic organisational models of doctoral studies oriented to promoting the quality of studies:

- postgraduate school - an organisational structure covering doctoral candidates and students at master level; provides administrative services, ensures the development of transferable skills, organises student admission, courses and seminars, and takes responsibility for quality assurance;
- doctoral/research school - an organisational structure that includes only doctoral students; can be organised for a single discipline, research theme or interdisciplinary research, with a focus on the creation of research groups/networks; may include one institution or several institutions, organising cooperation between them.

The advantages of Doctoral Schools compared to traditional structures can be formulated as follows:

- Doctoral schools determine the mission or vision shared by all partners, which facilitates the transition process from doctoral students to excellent researchers;
- Doctoral schools provide a stimulating research environment and promote cooperation between various disciplines;
- Doctoral schools provide a clear administrative structure for doctoral programmes, candidates and supervisors, setting a clear profile and status of doctoral candidates;
- Doctoral schools provide a critical mass and enable the overcoming of isolation of young researchers;
- Doctoral schools bring together senior and junior researchers;
- Doctoral schools support and facilitate the work of supervisors;
- Doctoral schools organise student enrolment with transparent rules;

- Doctoral schools provide training for teaching and transferable skills;
- Doctoral schools facilitate career development, including advices on funding studies (scholarships, projects);
- Doctoral schools guarantee quality assurance and monitoring;
- Doctoral schools provide a framework for the development of policies, procedures and mechanisms in higher education institutions and act as independent arbiters (protectors of rights) when necessary;
- Doctoral schools support mobility, international and inter-institutional cooperation.

## **2. CONCEPT AND STRUCTURE OF DOCTORAL SCHOOLS IN SERBIA**

### **2.1. General Preamble**

DS is organized as a unit of a University (Faculty), in accordance with the Law on Higher Education:

- confirming validity of the Salzburg Principles and Salzburg II Recommendations as guiding documents for EHEA;
- starting from the basic goals of doctoral studies as a tool to acquire knowledge through original research, which qualifies young researchers for their further research career in academic and research institutions, in Industry, economy and in the society at large;
- starting from the desire to ensure critical mass of quality researchers, emphasizing the importance of inter-, multi- and trans-disciplinary research;
- starting from the desire for higher transparency and better contacts between teachers and students in all respects;
- starting from the desire to stimulate integration processes in Serbian HE;
- understanding necessity to provide doctoral students additional competencies and transferable skills, important for their careers;
- having in mind extremely high importance of better organisation of supervision, as a basis for successful research work;
- having in mind the importance of getting experience in education, as well as in real sector before the end of studies;
- envisaging the need for strengthening institutional responsibility for quality and efficiency of doctoral studies;
- following strategic orientation towards international and inter-institutional collaboration in science and higher education.

### **2.2. Activities of Doctoral Schools**

Doctoral school (DS) represents a form of organized institutional support to organization, improvement of efficiency and quality assurance of doctoral studies.

Doctoral schools, within the framework of its activities, will consolidate accredited study programs and will be the initiator of new study programs. DS can initiate and realize joint doctoral studies with other HE institutions in Serbia and abroad, in accordance with the Law on Higher Education (LHE) and recommendations of the Commission for Accreditation and Quality Assurance (CAQA).

DS realize special programs of doctoral training aimed at acquiring additional knowledge and skills, both in the basic field of research and in general skills, as well as at exchanging doctoral study students, which will encompass:

- specialist courses, organized in cooperation with other HE institutions, aimed at providing information about up-to-date research in selected areas;
- transferable skill courses organized by a University, or other organization;
- doctoral seminars, organized in cooperation with other HE institutions, with the aim to provide an information about research in different complementary areas, and to stimulate in such a way interdisciplinary and trans-disciplinary dialogue between young and more experienced researchers.

DS releases a certificate for the realized training program, which represents a part of the Diploma Supplement.

DS provides support to the students in all elements of the realization of study programs and research. DS provides permanently information about:

- aims, methods and contents, time and place of the realization of teaching part of doctoral studies;
- criteria applied at exams, together with the ways of insuring publicity of exam procedures and getting information about the achieved results;
- programs of doctoral training, time and place of particular events.

DS organizes contacts with the labour market and industry/business/private sector.

### **2.3 Organization and Professional Bodies**

Internal DS organization, its functioning and management, as well as the way of performing its professional, administrative and technical duties are arranged by a special regulations.

DS is lead by a Coordinator. Professional bodies of a DS are its Program Council and Supervision Council. The Coordinator chairs the Program Council.

Program Council is a professional body having as its members teachers who fulfil accreditation standards for supervisors, defined by CAQA. The number of its members is defined by the HEI Statute. Program Council is elected by the Senate/Council of a HEI.

Council of supervisors encompasses all supervisors of doctoral theses, according to a decision of the Senate/Council of a HEI.

***Program Council:***

- follows realization of doctoral study programs, and gives its reports to the Senate/Council once a year;
- proposes rules and regulations for organization of teaching;
- follows the results of research activities and progress of students;
- proposes to the Senate/Council new study programs, in collaboration with Faculties/Departments;
- proposes to the Senate/Council changes of the existing study programs;
- proposes joint study programs with other HEI's in Serbia and abroad;
- initiates participation in domestic/international research projects;
- proposes the number of students to be enrolled;
- proposes code of ethics and takes care of intellectual property;
- takes care of the relations between teachers and students;
- proposes committees for evaluation and defence of doctoral dissertations;
- gives its opinion about a dissertation proposal;
- implements quality assurance of doctoral studies;
- takes care of procedures for self evaluation of study programs;
- proposes teachers for particular courses;
- proposes participation of visiting professors;
- formulates rules and regulations of its own functioning, etc.

***Supervision Council:***

- defines a supervision team for each candidate, which follows students work in research and gives reports at least twice a year;
- defines teams for resolving conflicts between students and supervisors;
- follows publication parameters of the obtained results and gives its reports, etc

### **3. IMPLEMENTATION TYPES**

#### **3.1. University Level**

DS, satisfying the entire set of the above given principles, can be directly implemented to study programs that have already been accredited at the University level. In this situation Universities, through their bodies and organs, directly organize DS and specify their competencies.

a) DS can encompass ALL study programs accredited at the University level, with a clear idea to promote inter-, multi- and trans-disciplinary studies and research. In this sense, it is clear that one achieves in this way critical mass of researchers, together with an adequate support to the supervision system based on several supervisors for one candidate. Also, courses of transferable skills can be organized with a high flexibility. Career guidance can be successfully covered through competencies of the Council for studies at the University level (e.g., University of Belgrade), in the sense of treating DS as a special body of this Council.

b) DS can be composed of particular SUBSETS of study programs at the University level; these subsets should correspond in this case to consistently defined research fields. In this way one achieves additional homogeneity in the professional sense; this places also an additional emphasis on the Supervision Council and contributes to quality by increasing the critical mass of researchers in a homogeneous scientific field.

c) ONE study program accredited at the University level can organize a DS, with the primary aim to achieve better contacts students-teachers, better career guidance, better supervision and more efficient organization of courses of transferable skills.

d) INTEGRATED UNIVERSITIES provide a good environment for organization of doctoral schools. All the above given DS attributes can be achieved more directly and more efficiently. Consolidation of doctoral studies come out in this case directly from the basic nature of the integrated universities. It is possible that the process of the essential, functional integration of the Universities in Serbia can start exactly from the introduction of doctoral schools.

Formally, implementation of DS at the University level subsumes corresponding decisions of the University Senate/Council, and, eventually, some changes in the University Statutes.

#### **3.2. Faculty Level**

Having in mind the current situation in the Serbian HE (from the point of view of the independence of Faculties/Departments), DS can be implemented at the Faculty level.

a) SUBSETS of Faculties within the same University can organize a DS. It can be based on several accredited study programs, where students enrol directly, as before, formally out of the DS context. The idea of introducing DS is based on all the above described attributes, leaving all final formal decisions to the Faculties themselves; however, is obligatorily consulted in all cases relevant to doctoral studies. Obviously, one achieves in such way critical mass of researchers, better teaching quality, better supervision quality, and more flexibility in the organization of transversal courses.

b) DS can be organized by ONE Faculty. Such a DS can serve to integrate more study programs (modules), and to achieve, consequently, critical mass of researchers, better supervision and easier organization of courses of transferable skills.

At the Faculty level, relevant by-laws should be appropriately adapted. DS founding documents should be a result of good will and inter-Faculty agreements, where all relevant details should be specified.

### **3.3 Inter-University Level**

DS can be successfully organized at the inter-University Level. The main actors can again be either Universities or Faculties themselves, as autonomous entities.

DS at the inter-University level should dominantly support studies in consistent research fields, increasing in such a way the mass of high quality researchers and improving supervision. It is logical to subsume that the DS members would be Faculties related to the same fields at different Universities (Electrical Engineering, Chemistry, etc.). Organization of transversal courses becomes easier in this case. Particular study programs can be accredited by the participating Universities. An important challenge is to formulate and accredit JOINT study programs.

## **4. DOCTORAL SCHOOLS ORGANIZED BY RODOS**

In the sense of the explanations done within Activity 4.1, the following Doctoral Schools have been founded::

**1. Doctoral School of Mathematics.** Faculties of Mathematics of the Universities of Belgrade, Novi Sad, Kragujevac, Nis and Belgrade, together with the Institute of Mathematics of the Serbian Academy of Sciences and Arts, proposed a Doctoral School of mathematics, an elite

organization offering a set of courses taught by the best teachers in Serbia, and organizing doctoral research projects supervised by the best researchers in particular domains. The School does not require any need for changing legal regulations. However, it requires accreditation, already done by CAQA..

**2. Doctoral School of Medicine.** The envisaged Doctoral School will take care primarily of transversal skills, by organizing specific courses for all doctoral students at the Faculty of Medicine, University of Kragujevac, which contains many different Divisions (study programs). It will also organize supervision in a more efficient way. Accreditation has been done by CAQA.

**3. Doctoral School of Technical Sciences.** The Faculty of Technical Sciences at the University of Novi Sad made a decision at the highest hierarchical level level to organize a Doctoral School of Technical Sciences, comprising 16 study programs in different disciplines of Technology (Electrical, Mechanical, Civil Engineering, Architecture, Applied Mathematics, etc). The School follows structurally the model adopted by RODOS and presented in the book **From Doctoral Studies to Doctoral Schools**, covering transversal skills, supervision, multidisciplinary and carrier guidance.

**4. International Doctoral School of Megatrend University.** University Megatrend (new name: John Neisbitt University) organized an International Doctoral School in all the fields covered by the existing Faculties. International partner on the basis of Joint Degrees have been selected to be University Primorska, Slovenia, and Bari University, Italy. The model follows the concepts adopted in Rodos. The study programs have been accredited by CAQA.

**5. Doctoral Schools at the University of Belgrade.** University of Belgrade has undertaken a multitude of measures oriented towards incorporating Doctoral Schools in its practice. Besides the introduction of Doctoral Schools in its Regulations for Doctoral Studies, University of Belgrade decided to merge all doctoral study programs at the University level and to organize a Doctoral School of Belgrade University. Following the adopted general line of thought, RODOS organized and funded a course of transferrable skills (TRAIN Program, spring 2016). Following one of the paradigms, a Doctoral School of Medicine will be established jointly with the Faculty of Dentistry and Faculty of Pharmacy. University of Belgrade will continue to organize a large number of Doctoral Schools in near future (guaranteeing high sustainability).

**6. Doctoral School of Biology.** This Doctoral School will be centred around the Faculty of Biology at the University of Belgrade and the Institute of Molecular Genetics and Genetic Engineering, member of the University of Belgrade, as an example of a fruitful collaboration between Universities and Research Institutes. The School will primarily take care of the laboratory facilities and research, trying to put together Faculty and Institute staff and to improve supervision. The School will also take care of the organization of transversal skills needed for biologists.

**7. Doctoral School of Arts.** University of Arts in Belgrade, has an intention to implement a Doctoral School of Arts, in which the particular Faculties (Music, Painting, Applied Arts, Theatre) will formally continue functioning as before, but in which transversal skills would be taught within the School. In this sense, a doctoral training was organized by RODOS team



25/04/2017 in cooperation with the Intellectual Property Office of the Republic of Serbia, Belgrade, devoted to diverse aspects of intellectual property in arts. Further steps do not require accreditation - only decisions at the University level.

**8. European Joint Doctoral Degree in Science and Technology for Cultural Heritage Preservation.** The Institute of Physics, as a member of the University of Belgrade, conceived and organized a Doctoral School with the University La Sapienza, Italy, Politecnico do Milano, Italy, University of Avignon, France and University devoted to Science and Technology for Cultural Heritage Preservation. The students will get Multiple Doctoral Degree from the Universities consortium members. The Institute of Physics applied for funding this Project from EU funds.

**9. Doctoral School as Initiative of an R&D Institute.** Vlatacom Institute, Belgrade, decided to organize a Doctoral School in the area of Advanced Information and Communication Technology (Radar Systems, Electro-Optical Systems, Cryptology) using its own human and technical resources, in conjunction with Metropolitan University, which would cover aspects in its domain of competence. Documents are prepared; in near future decision will be made to initiate the accreditation step.

It was decided at the PMB to add an additional value to the Project by organizing several courses related to transversal skills (research methodology, project management, composition of scientific papers, research ethics, etc.). These courses would be kept open for all doctoral students at a particular Universities (nucleus for the organization of these courses was made at the PMB meeting at Novi Sad on April 3rd 2015). It is expected to achieve in such a way two main goals: 1) to get more experience in organization of short courses for doctoral students (similar to those organized in UGent); 2) to show in an evident way advantages provided by Doctoral Schools.

## **5. DOCTORAL SCHOOLS ACCREDITED AND IMPLEMENTED**

According to the results from deliverables 4.1 – 4.3, extreme efforts have been done in the direction of formal establishment and implementation of the founded Doctoral Schools. Having in mind the adopted methodology, a large number of Schools (much more than planned in the Proposal) of diverse kinds have been founded, each having its own specific properties. At the end of the Project eligibility period, we have the following situation:

- 1) **Doctoral School of Mathematics**, accredited, students enrolled in 2016,
- 2) **Doctoral School of Medicine**, accredited, students enrolled in 2017,
- 3) **Doctoral School of Technical Sciences**, applied for accreditation,
- 4) **Doctoral School of the Megatrend University**, accredited, students enrolled IN 2016,

5) Study programs on **Bio-photonics and Biomedical Engineering and Technology** (part of the University of Belgrade - interdisciplinary Doctoral School in the process of establishing) accredited (financially supported by RODOS) students enrolled in 2016,

6) **Doctoral School of Biology**, accredited, students enrolled in 2015,

7) **Doctoral School of Arts**, study programs accredited, student enrolment in doctoral training in 2017

8) **European Study Program in Science and Technology for Cultural Heritage Preservation**, submitted for EU funding,

9) **Doctoral School in ICT promoted by Vlatacom Institute**, currently under consideration by several HEIs.

It is of utmost importance that numerous HEIs expressed their willingness to organize and implement a Doctoral School. This represents the most important result, guaranteeing high Project sustainability.