

Is it possible to make a good PhD programme in a small scientific community: Croatian experience after previous two PhD conferences

(NATIONAL REPORT)

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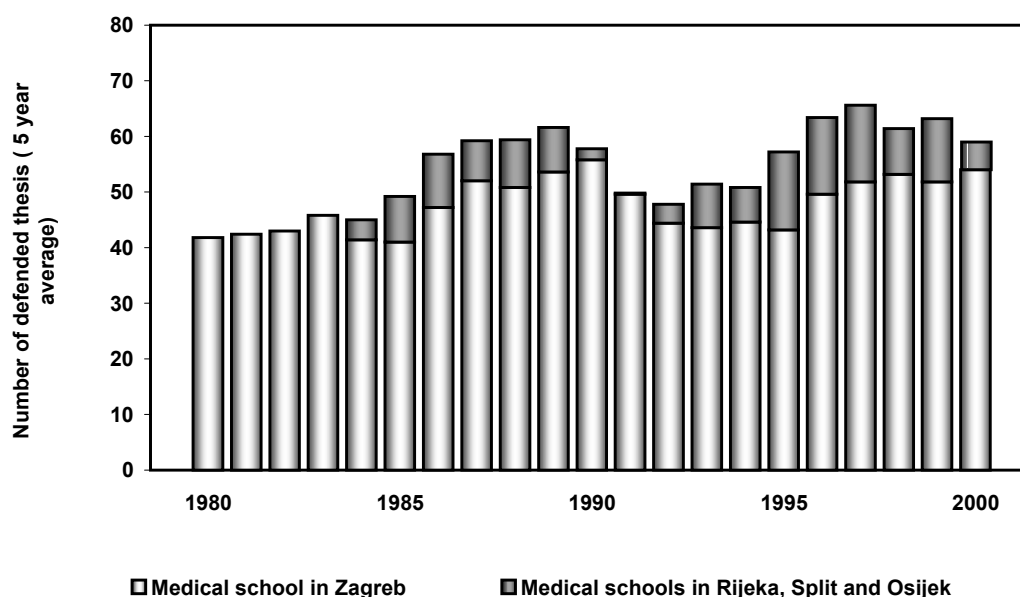
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Introduction

Croatia has four Schools of Medicine as parts of four universities: in Zagreb, Rijeka, Split and Osijek. The table shows some basic data related to number of students, scientific output and total number of students in PhD programmes.

University	No of students enrolled in the 1st year graduate studies 2006/2007	No of articles cited in PubMed in the last five years	No of candidates enrolled in the PhD programme
Zagreb	282+25 in English study programme	3111	270
Rijeka	135	344	51
Split	75	343	20
Osijek	75	187	68

Every year there are 40-65 new PhD theses presented in the field of medicine and health sciences, most of them being presented in Zagreb. From this numbers it might be assumed that the number of students in PhD programmes is disproportional to known “scientific capacity” of the country. However, in the past PhD programme was not organised, nor did medical schools consider that as a mandatory part of their activity.



Number of PhD Thesis defended at medical schools in Croatia during a 20 year period

Croatia as well as numerous East European and some South European countries is characterised by modest if not small scientific output in comparison to scientifically developed countries and has some characteristics known in the studies of science as small scientific community or scientific periphery with “intellectual island effect”. Some time ago that was a characteristic of many European countries.

A “small scientific community” is not a demographic term, but a term that defines a community as being autarchic, more or less separated from the rest of the world, with insufficient critical mass in most scientific disciplines (Maričić S. 1990) 1. The consequence is that in these communities it is difficult and sometimes not possible to organise an objective assessment of scientific performance. Constant evaluation of thesis, grant application, research papers are the inevitable part of a scientific process. Evaluation is usually done by peer review. The fundamental proposition of peer review is that it should be done by (1) competent and (2) independent experts. In a small scientific community the number of competent experts in a certain field might be very small (even there might be only one) and in certain fields researchers independent from each other do not exist. Therefore these communities, if they have not developed close cooperation with international scientific community do not possess self-regulation process, which aims at the selection of quality and elimination of low quality research, efficient regulation of scientific misconduct etc.

There are, however, two objective barriers which can hinder the abandoning of a small autarchic scientific community system: (1) financial and (2) “patriotic”.

1 It can be a financial burden for a small scientific community to sufficiently support research of PhD candidate and involve fellow experts from other countries in the process of peer review and the evaluation of thesis.

2 On the other hand, there is a “patriotic” barrier, in the sense that every community prefers national language rather than a language which is used by international scientific community (which is mostly English), simply because it wishes to preserve and develop the national scientific vocabulary. Furthermore, although some universities lack high quality professors, very often the decision will be in favour of local experts in spite of their low scientific performance. A difficult question which may occur here is: how to strike an optimal balance between the need to be a part of international scientific area and the need to preserve the national identity and the national language?

International tradition of high education and research in Croatia

In Croatia university education in the medical field started to develop in 1917 with the foundation of the School of Medicine in Zagreb. The first professors came to the School of Medicine from the eminent universities of the Austro-Hungarian Monarchy as well as Russia after the October Revolution. They brought not only their knowledge and experience, but also their openness to the world. It has never been sufficiently investigated why, but after the disappearance of this generation and the arrival of the egalitarian socialist environment, the development of medical science in Croatia acquired characteristics of autarchy and a small scientific community.

PhD in Croatian medicine and health sciences

The first doctorate was defended in Zagreb in 1955. However, in the course of those past 50 years, the criteria of the quality of the PhD thesis were not firmly binding, and consequently, there were PhDs that resulted in valuable scientific discoveries published in eminent scientific journals but there was also a large number (about 2/3, see later) of those which never produced a single scientific paper. The end result was inhomogeneous quality and a large number of scientists without measurable recognition in scientific community outside Croatia.

Looking for good example in Europe

The beginning of doctoral studies in Croatia goes back to the academic year 1996/97 in Rijeka and 1997/1998 in Zagreb. Although (with the idea of doctoral studies), those studies were first organised as scientific MSc studies until 2002/2003 when a legal framework was set to organise PhD studies. Since then it has become clear that certain changes in the sense of organisation and setting the criteria were needed. Thus, it was decided to follow European trends, but we found out that, at that particular time, the PhD programmes in Europe were not well-defined and they were different from country to country. There was, however, similar need and the willingness in many European countries to achieve consensus in defining what PhD programmes should be and how to organise them.

Organising European conferences

The need for better-defined PhD programmes and homogenous criteria in many European countries, as well as the willingness in many countries to break up with the tradition of a small scientific community, lead to the First European Conference on Harmonisation of PhD Programmes in Biomedicine and Health Sciences held at the University of Zagreb – School of Medicine, where we tried to find out whether the consensus is possible to achieve. The Conference ended with [the Declaration of European conference on harmonisation of PhD programmes in biomedicine and health sciences \("Zagreb Declaration"\)](#).

The second Conference on Harmonisation of PhD Programmes in Biomedicine and Health Sciences followed in April 2005, and it produced the *Guidelines for organisation of PhD programmes in biomedicine and health sciences*, as well as initiative of foundation of ORPHEUS - ORganisation of PhD Education in Biomedicine and Health Sciences in the EUropean System. The criteria were further set: among other things, mentors of the PhD candidates could no longer influence or be involved in the process of evaluating the doctorate, criteria for mentors were also defined etc.

Harmonisation of PhD programmes in biomedicine and health sciences in Croatia; impact of two European conferences

After "Zagreb Declaration" we have started a process not only of improving our PhD programme but also a process of gradual abandoning the characteristics of a small scientific community.

This belief is based on the following: after the Symposium organized by the University of Zagreb, School of Medicine, HAZU-Croatian Academy of Science and Arts, and [The National Foundation for Science, Higher Education and Technological Development of the Republic of Croatia](#) in 2005, "Zagreb Declaration" was generally accepted, which meant that it became impossible for anyone to get a PhD without having scientific papers published in internationally recognised journals (in all medical schools minimally one must be in journals listed in CC).

The second 2005 Conference and the Guidelines for organisation of PhD programmes in Biomedicine and Health Sciences, prompted us to organise the other Croatian symposium in 2006 which was held by the same parties as the first one, which gathered deans, vice-deans and chiefs of postgraduate programmes not only from Croatian medical schools, but also Faculty of Dentistry, Faculty of Veterinary Medicine, Faculty of Science, Faculty of Pharmacy and Biochemistry, Faculty of Education and Rehabilitation, and University Scientific Postgraduate Study 'Language and Cognitive Science'. The participants of the Symposium concurred to sign an agreement on cooperation and formation of the network of PhD programmes in Croatia in Biomedicine and Health Sciences with the purpose of improving

the quality of PhD programmes, enhancing the mobility of the PhD candidates, harmonising the criteria of enrolling and graduating from a PhD programme, and the possibilities of starting joint interdisciplinary programmes. The relation between mentor and mentee is better defined, mentors of the PhD candidates can no longer influence or be involved in the process of evaluating the doctorate. The research component of the PhD study is defined, a new form of thesis is established, which includes published materials associated with the research and the first ones in new forms have already appeared in Split and Zagreb. The English doctoral study programme is instituted at the University of Zagreb, School of Medicine, the agreement on cooperation in doctoral study with the University of Ljubljana School of Medicine signed.

At the same time, apart from the doctoral study development, our medical schools have agreed in adopting the other Bologna principles: we are working on the diploma supplement, quality assurance, promotion of European dimension in higher education, promotion of continuous professional development in medicine as the university life long learning process. Together with our government we decided not to apply the two cycle (BA/MA) system in medicine.

Conclusion

We think that after two international Zagreb conferences and two meetings of Croatian medical schools and biomedical faculties, in the framework of Bologna process in Croatia, we have made a big step forward in developing the doctoral cycle in higher education, the research thesis. However, in order to accept this statement, we have to be aware of the situation in PhD studies, more than ten years ago.

According to the survey by Frkovic et al (2003) during the 10-year period (1990-1999), 634 PhD theses were defended at the Rijeka and Zagreb University Schools of Medicine. There were 34% PhD theses that resulted in articles published in journals indexed in MEDLINE and 20% PhD theses that resulted in articles published in Current Contents journals. Most of the theses resulted in a single publication (95%), 19 (5%) in 2, and 2 in 3 publications. In other words, 2/3 of PhD theses in the previous period did not result in any visible scientific paper.

Later on, in the year 2005, among 117 full time research fellows (PhD candidates), a total of 36 (29%) published in Current Contents listed journals at least 0.5 articles per employment year (Polasek et al 2006). As compared to the earlier study (Frkovic et al 2003), the research fellows now publish more articles per year than an average PhD previously published during the whole period of thesis research. We think that, among others, new criteria for PhD study influence such a development.

Our next steps will be:

1. to stimulate and make possible the "Scandinavian type" of thesis, to promote the research environment with independent and competent international review process;
2. to stimulate the international cooperation in Biomedical and Health Sciences, particularly the doctoral study programmes including the laboratory and other practical rotation, exchange in organised courses for PhD candidates, joint doctoral studies, joint mentorship etc.;
3. to implement the legal duties in quality assessment in doctoral as well as other study programmes;
4. to make all efforts to fully integrate Croatia into the European Higher Education Area and European Research Area.

In the past decade Croatia adopted its National Scientific Research Programme and a science and technology policy for the period until 2010 (Ministry of Science, Education and Sport 2007, Pavelic et al, 2006). The policy calls for new founding instruments and research programmes as well as for new rules and procedures. We also have high expectations for

our colleagues in the west as well as for international scientific organisations. Existing mechanisms should be better used, new mechanisms developed to put material and human scientific resources of European Research Area into the service of European science and society.

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