



Higher Education and Human Capital:

Re/thinking the Doctorate in America.

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Sense Publishers.

A C.I.P. record for this book is available from the Library of Congress.

ISBN: 978-94-6091-416-4 (paperback)
ISBN: 978-94-6091-417-1 (hardback)
ISBN: 978-94-6091-418-8 (e-book)

Published by: Sense Publishers,
P.O. Box 21858,
3001 AW Rotterdam,
The Netherlands
<https://www.sensepublishers.com>

Printed on acid-free paper

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3. RE/THINKING RESEARCH TRAINING

Scientific Productivity as the Beginning of a Life Program

When we hear America, as Mexicans we think in American Continent, not just United States of America. Our reflection about doctoral programs therefore is based not in United States current and historical conditions surrounding this issue, but on Latin-American point of view that is extensive to Ibero-American countries. In this book the editors posit that the doctoral degree in America (United States of America) is either taking two paths: the idea of university research or the doctorate itself. This book, they have said, takes on the second idea.

Nevertheless in Mexico among other Latin-American countries both paths are useful even necessary. It seems to us that choosing the first path involves accepting doctorate conceptualized as an institutional goal, while the second one implicates the doctorate as an individual goal. Our proposal is to create a kind of bridge between both paths to integrate them as the core of the same goal. In this sense our point of view is that the key to have a successful doctoral program is to take it not only as a university research training program or only as doctorate it self, but a program for research teams consolidation.

So we do not see doctorate degree as an individual isolated goal or like an institutional collective goal. We propose it as an inter-individual teamwork goal, which is integrated by professors and students. The first ones aimed to the consolidation of university research, the second ones to consolidate doctorate itself. While as a team, they work for research as a lifestyle.

Historically the development of doctoral programs in the United States is pretty different to Europe. In the last century before the Second World War, the European doctorate model was established after college, while United States offered master degree between college and doctorate. After the Second World War, United States more than ever was aware of the relevance of research development for its nation. Thus university research becomes a priority and so United States adopted the European model. Actually, Europe, United States and Latin-American countries offered either two models.

Our proposal is that master programs must put together a group of students and professors sharing the same main interest and way of thinking. Then doctoral programs could be the way to give shape to a thinking school or theoretical framework in order to generate, transmit, transfer, apply and diffuse knowledge as a lifestyle. That is what we propose as a Life Research Program that lies in scientific activity and

D.M.C. Pérez et al., (eds.). Higher Education and Human Capital: Re/thinking the Doctorate in America. 31-52.

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productivity in a collaborative way among students and professors for all their academic lives; working in the same or new research team and creating research networks.

For us, to foster the consolidation of a research team involves leaders training; leaders which will help to go deeply into the theoretical proposal that give foundation to every work of the research team which the doctor in training belongs to; or leaders that will conform and consolidate their own research team or research network. Any of these options focus on the main goal of increasing research activity and productivity benefiting each team member in an individual way and so improving research in an institutional even national level.

Thus, research team productivity is based on intellectual capital, guided by institutional, national and international standards, linking individual and the team interests. Hence through research we cannot just improve the sciences, as science model establish, but solve social problems without losing individuality. The matter is inter-individual coordination, because for us, theoretical change in science field is not a social product, but an individual proposal that is shared and socialized.

Without being eclectic, the proposal we submit is based on the reflection of several works: The criteria of Organization of Ibero-American States for Education, Science and Culture (OEI for its acronym in Spanish: Organización de Estados Iberoamericanos); the Seventh Framework Program (FP7) by the Europe Union; the master's degree thesis by one of us (Rosas-Colin, 2008) focus in research training in Instituto Politécnico Nacional (IPN) and, our experience as members of a new research team in the IPN under the leadership of the other of us (Rodríguez-Salazar).

We are working together in the development of an epistemology of imagination, the theoretical proposal of the leader of the team (Rodríguez-Salazar, 2008; 2009; Rodríguez-Salazar, Hernández-Ulloa & Rosas-Colin, 2009). Our aim about epistemology of imagination is to establish this proposal as an epistemological, psychopedagogical school for scientific development, as well as a model for scientific and technological education.

CRITERIA FOR THE CREATION AND IMPROVEMENT OF DOCTORAL PROGRAMS ACCORDING TO THE ORGANIZATION OF IBERO-AMERICAN STATES FOR EDUCATION, SCIENCE AND CULTURE (OEI)

Some members of the Organization of Ibero-American States for Education, Science and Culture (OEI for its acronym in Spanish: Organización de Estados Iberoamericanos), have made a global analysis about the relationship between developmental conditions of university research and doctoral programs (Sebastian, 2003). This analysis makes possible to the OEI to establish the framework for a Strategy Program which has the objective to give an approach to understand and improve doctoral degree in Ibero-America region. The analysis involves data about the historical and current conditions in which research has been developed in this region. The results of the analysis highlights that research is restricted to the universities in Ibero-America. Doctoral programs constitute the principal start point for this activity and training process. Both research and research training play a vital role in our days for nation's development. This point of view is important because it shows the

current tendency in this field in our region. Likewise this view has been important to establish our own point of view about the issue as well as our alternative.

According to the OEI universities have assumed the function of contributing to social and economic development through research and research training since the end of 20th century. Therefore, OEI's educational policies have been ride by the assumption that fostering research in Post College makes possible to guarantee quality and pertinence in researcher's contributions for social well-being, as well as knowledge advance and diffusion in Ibero-America. For the OEI, doctoral programs is an indicator to measure the research potential of the countries (Sebastian, 2003). Furthermore, doctoral degree in conjunction with ranking research systems provides the number of researchers that a nation has, as well as their productivity level and the impact of their contributions. Under these criteria, the OEI has pointed out a big problem in Latin-America: the low percentage of professionals and academicians with doctor degree, and in the other hand, low productivity by Ibero-American doctors.

The increasing of number of doctors has been the OEI's priority, especially in Latin-American. While in Spain and Portugal have started to think about measures to increase productivity and its impact. For instance, in Spain the idea is emerging that the fostering of postdoctoral hosting is needed in order to increase scientific productivity. Nevertheless other voices claim for the improvement of doctoral programs to promote scientific productivity in the framework of Human Capital Theory (García-Romero, 1999). We are in agreement with the idea that the solution is not in postdoctoral hosting but in the appropriate design and implementation of doctoral programs. Our proposal is not based on Human Capital Theory, which belongs to the management field. We consider that it is better to lay the foundations of our proposal on an epistemological, psychological and pedagogical framework due to the nature of the problem. The framework of our proposal is derived from Jean Piaget Psychogenetic Theory and his Genetic Epistemology. Farther on we will take back this idea.

Given the increase of academicians with doctorate degree the priority of the OEI, it has analyzed specific indicators for the creation or improvement of doctoral programs. From among these indicators there is the *researcher's distribution according to the fields of study*. The OEI's analysis into this issue shows that the tendency of research training in Latin-American goes for Social Sciences, then for Basic Sciences and Math, Medical Sciences, Engineering and technology, Agrarian Sciences and finally Humanities (Sebastian, 2003). The OEI has not yet considered interdisciplinary doctoral programs. In this sense we think that it could be useful to point out and foster those sorts of programs, because from our experience in a Master interdisciplinary program (Methodology of Science), we are convinced that interdisciplinary work favors creativity and productivity.

Another relevant indicator for the creation or improvement of doctoral programs according to the OEI is the *gender aspect in the academic community*. In spite of female presence is increasing in Latin-American universities (as all over the world), talking about research activities and productivity women participation is not good enough to considered a reasonable equity in this issue. This problem is accentuated in specific fields of study, as Mathematics and Basic Sciences. In spite of the promotion