

# Social impact of research in the university

## *Impacto social da pesquisa na universidade*

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*Research in a serious University must be institutionalized; it cannot be the result of an isolated vocation of a professor or of Groups. It should be the natural consequence of assistance and education of excellent quality. And vice-versa. (CS)*

In the Brazilian educational scenario, the national universities fundamentally depend on the funds of the agencies for the full development of research, such as FAPESP, CNPq, CAPES and FINEP. In the specific case of the State Universities of São Paulo, the budget based on a percentage of SIMS funds (Tax on Operations Relative to The Circulation of Merchandise and on Interstate and Intermunicipal Transportation Services and Communication)<sup>1</sup> is basically destined to the payment of teaching and non-teaching staff. The public faculties of medicine linked to the Secretariat of Economic Development, Science and Technology of the State of São Paulo, have a fixed budget annually readjusted or recalculated, also destined to payment of the staff. In public Brazilian universities there still is no culture of donations or generation of income through institutional funds of the university itself, the traditional endowments of Harvard University and of the Massachusetts Institute of Technology (MIT).<sup>2,3</sup> For example, 20% of the Harvard budget

comes directly from the American government and most of the rest comes from donations and investment of the endowments of the institution. This favors autonomy to the university, freedom of research and intense scientific and technological advancement.

In our country, the excellence of these educational Institutions is mainly due to their organizational structure and to the possibility that Research Groups consisting of professors with a relevant scientific production, will be able to obtain funds for scientific investigation, for the acquisition of consumables and of permanent equipment that will be later incorporated by the Institution.<sup>4</sup> Thus, research is a necessary instrument not only for the production of knowledge, but also for the acquisition of resources for institutional viability.<sup>4,5</sup>

Thus, public universities perform better in any process of evaluation since they have the highest scientific production, justifying the governmental investment through the supporting agencies as a function of the merit achieved. It is society investing through the state, with a return obtained from it (Figures 1 and 2).<sup>4,5</sup>

It is expected that in a University, as the name itself implies, there should be professors with varied profiles, some having a greater vocation for research, others for teaching, and still others for assistance. In-

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deed, in most cases there is an equilibrium among these important functions for the advancement of science, but, among them, research is the characteristic that should direct the professors of large universities so that they may influence assistance and teaching of excellence.<sup>4,5</sup> As an example, in a faculty of medicine, in clinical departments assistance of excellent level should generate constant questioning regarding clinical or experimental research of high level that would induce advancement of science and technology.

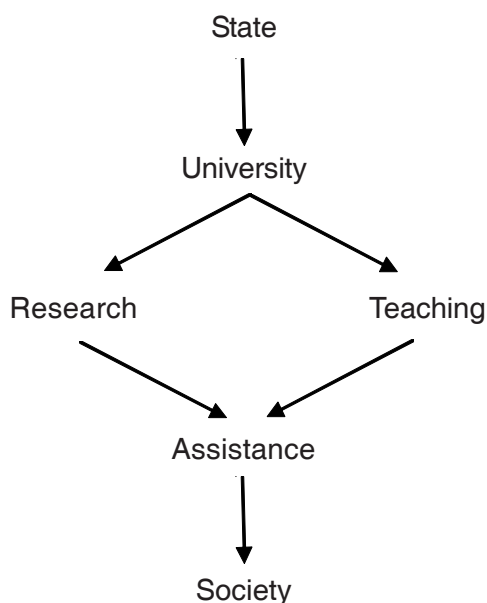


Fig. 1 - Relation between State, Research, Teaching, Assistance, and Society.

Research is basically carried out in postgraduate courses in an institutionalized manner, generating the government funds of the financing agencies depending on the competence of the professors and the students, who are rigorously selected.. In addition, there is also research generated by graduation by formal mechanisms of scientific initiation (SI) and monitoring groups.<sup>4,6</sup>

SI in medicine, in its wider context based on the production of knowledge promoted by scientific research in either the clinical or experimental area, has the objective of creating a critical spirit in the student, recently inserted into this scientific milieu, and above all to encourage him to become effectively involved in the process of investigation and in the learning based on it, with a consequent interest in science under the

guidance of an adviser, permitting his growth as a person and as a student. The organization of ideas in scientific and technological knowledge, necessary for the development of research, favors a constant evolution of the cognitive and psychomotor skills of both students and professors, so that the undergraduate will not only expand his formal curriculum, but will also develop and exercise extracurricular skills and abilities that will indirectly influence him in his training<sup>5,6</sup>.

Thus, it can be seen that, when there is an advantageous teacher-student articulation in their transpersonal relationship, there is a natural and progressive acquisition of knowledge by both parties, with reciprocal benefits. The importance of the research process for the student is mainly the fact that this process turns him into an active part in the construction of knowledge. When the student abandons the position of mere spectator and takes on a critical and participative role in view of the theories presented to him, the learning process becomes more dynamic, palpable and illustrative, affecting the quality of the future professional, who will be more complete and more secure when facing the challenges imposed by the exercise of his activities, since he will be able to have a more critical and investigative attitude towards these adversities. There will definitely be greater safety when dealing with the major paradigms of health, i.e., the humanization and integration of care, greater participation, equity, cost containment, appropriate use of technology, protection of the environment, and promotion of healthy life styles.<sup>7</sup>

In the history of medicine there are fascinating achievements by undergraduates who greatly influenced the advancement of medical knowledge. Andreas Vesalius prepared is well-known and amply debated text " *Humani corporis fabrica*" during his undergraduate course and published it four months after graduating from the University of Pádua. This was followed by the microscopic observations of capillary circulation made by Jan Swanmerdam. In 1779, Humphry Davy, at the age of 19 years, made important observations on the analgesic effect of nitric oxide. Paul Langerhans, working with Virchow, his professor in Berlin, was the first to describe the pancreatic islets that today carry his name.<sup>8</sup> Indeed, it can be seen that the traditional university trains a technician, but it is academic life outside the classroom, in the laboratories, on the wards and in the outpatient clinics together with a tutor that trains a differentiated professional, a competent man, the agent of change.

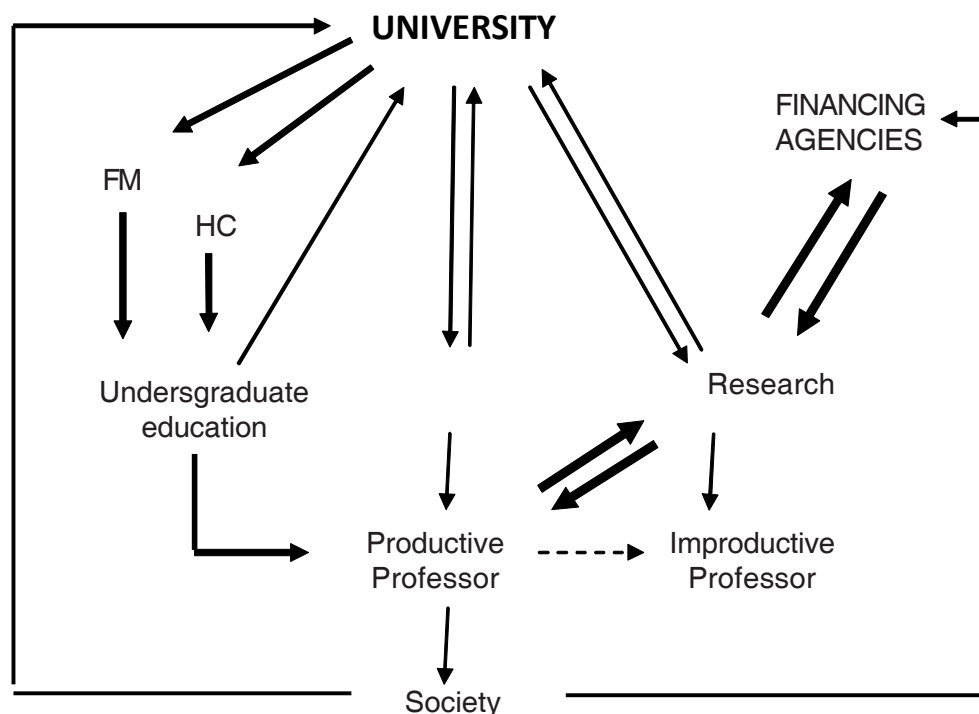


Figure 2: Complex University, Teacher, Student and Society interaction. FM: Faculty of Medicine ;HC: University Hospital.<sup>4-6</sup>

And, as the product of his school, this professional will actively participate in improving the quality and the coverage of health services, with his involvement in the processes that guarantee technological quality and evaluation<sup>4-9</sup>

The University is the site of production of knowledge, discussion of ideas, investigation and discovery of new realities. It is the source of science for a society and, on this basis it must keep a high level on influence on it, with a relevant impact on it. As examples, we may cite the impact caused on society by the effects of the discovery of X-rays by Wilhelm Conrad Roentgen (1845-1923) in 1895, the synthesis of penicillin by Fleming<sup>10</sup>; the benefits and the evils of nuclear energy for humankind, the importance of the full description of Chagas' disease by Carlos Chagas<sup>11</sup>, and the synthesis of bradykinin by Sérgio Ferreira.<sup>12</sup> It is important to emphasize here that, such is the greatness of these achievements, that it is not necessary to describe their full impact on education, on the progress of science and on the advances incorporated by society.

Thus research in the academic milieu has an impact, as demonstrated, based on the daily routine of students in their interpersonal relations and cognitive

development that will make them better qualified future professional better prepared for the work market even in more encompassing situations such as the policy of the educational institutions of the country, starting from the context of the agencies for the support of research and also for the society that surrounds these institutions and that is molded by the discoveries and productions of these investigations.

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