

***Technology in Brazilian Graduate Courses:
A Challenge to Move away from the Commonplace***

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Brazil is experiencing an accelerated expansion of the graduate system. Until the 1980's it was necessary to train human resources to work at universities. Since 1990, the priority has been altered to focus on the training of researchers for research institutes, universities and industry. Nevertheless, the system still presents a very strong demand for higher education teachers training.

In part, the demand for higher education personnel can be attributed to the unprecedented expansion of undergraduate education. From 1995 to 2010, the number of students enrolled in undergraduate courses has quadrupled, reaching more than six million students. The number of graduate students has increased about 2.5 times, reaching 190,000 in 2011.

Although this growth is significant, many related issues are still unresolved, considering the needs of the country. Among the population between 18 and 24 years old, only 19% effectively pursue a college degree. Among adults between 25 and 64 years old, only 11.6% have received college degrees, a much lower percentage compared with OECD countries (31.5%). For Brazil to achieve even such an average level, it would be required to increase threefold the number of undergraduate courses, implying an expansion of graduate training in different areas.

In 2011, 380,000 teachers (29% PhD and 38% master's) were enrolled in higher education: 54% at universities and 17% teaching in graduate schools. Thus, the Brazilian system of higher education still needs to improve the qualifications of about 120,000 teachers without master's or doctoral degrees. In addition, a threefold increase in the number of graduate courses is required to deliver the other 760,000 master's and PhD students.

Whereas 56,000 students accomplished graduate degrees in 2011, it would take 16 years to reach said goal, and even then, only for higher education. There is also a need for positions supporting graduate training in the non-academic sectors. In Brazil, the priority is to increase the efficiency of the training system for higher education with new paradigms and creative methodologies, including the use of new technologies.

Like several other countries, the use of information and communication technologies (ICT) in Brazil has been spreading quickly. Last year it was marked by the surpassing of the cellular phone line per capita landmark, with 83 million Internet users and 55% of households with computers. ICT is present in the everyday life of the Brazilian citizen.

The most prominent use of ICT in research and graduate education is a national centralized digital online resource that allows any person to search information on researchers, research groups and graduate courses, managed by the Ministry of Education and its branches.

The "Lattes" system is a broad public Internet database of academic curricula, maintained by the National Council for Scientific and Technological Development (CNPq), partnered with the Ministry of Science and Technology. Almost all researchers in Brazil have a curriculum in the "Lattes" which can be viewed by anyone worldwide.

The evaluation system of graduate education in Brazil is driven by the Coordination for Enhancement of Higher Education Personnel (CAPES). Each of the 3,342 programs provides the data of all activities undertaken in the previous year. Each student is individually registered, and finds detailed information on courses offered, the articles and books

published, patents, and any other type of intellectual production. Theses and dissertations are also indexed, uploaded, and made available for public consultation. CAPES also maintains and pays for a national electronic library. Faculty members, researchers, graduate, and undergraduate students of 407 institutions have free access to the full texts of more than 33,000 journals, theses, and dissertations (of these over 460,000).

Although the use of ICT has grown substantially, its use for academic purposes is still very incipient on some levels. Notably, the use of e-learning, which is still confused with distance learning, is the target of a lot of prejudice. Only in 2005 were e-learning courses fully regulated. In 2012, about 15% of regular undergraduate students were in the e-learning education system, especially in areas of training for primary and secondary school teachers. Only in 2011 with support from the federal government was the first e-learning graduate course administered in Brazil, to train Brazilian's mathematics teachers.

There is still no reliable data on the use of ICT in graduate schools. The National Plan of Graduate Education (PNPG) for 2011-2020, launched in 2010, pointed out several challenges that Brazil must yet face. Among them are reducing the regional and inter-area asymmetries of the system and meeting the need for social insertion, including more active interactions with educational and productive systems as a whole. However, the PNPG has neither delivered diagnostics of e-learning, nor identified it as either a tool or challenge for research and graduate education.

Noteworthy is a government initiative in the creation of the Open University of Brazil in 2006, a network that brings together more than 100 Brazilian public universities. Although geared specifically to offer e-learning courses, there is a great expectation that the ideas and practices that will be generated may contribute to create a more favorable environment for the use of ICT in higher education in Brazil.

Much of the effort has been spent to develop a large database containing useful information for the assessment of research and graduate courses. However, it is not enough to provide a qualitative leap of the system. It could be used more creatively to provide, for example, greater exchange between Brazilian and foreign researchers and centers.

The scenario here is not quite different from those presented by other users of the teaching technology. There is an urgent need to investigate in-depth the best ways of incorporating technology in the training of researchers in the graduate courses, preparing teachers for the appropriate use of those methodologies, regardless if by e-learning or face-to-face teaching, thus bettering the use of data contained in the national databases and digital infrastructure.