Developing Policies for RCR Training in Brazilian Graduate Programs: Current Challenges

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This presentation is based on my postdoctoral research proposal which focuses on developing RCR policies for Brazilian graduate programs in the sciences. The project is entitled “Developing Research Integrity Policies in Brazilian Graduate Programs in the Sciences: A Pilot Study at COPPE and the Institute for Medical Biochemistry, at UFRJ” This is the first project on RI initiatives and RCR training officially supported by a Brazilian funding agency (FAPERJ). Here, I will show preliminary results of focus groups from the pilot study that has started at UFRJ and address some of the current challenges to develop RCR training in Brazil.

(Part of this material was already presented at the Fifth Biennial Research Conference on Research Integrity in Niagara Falls, US, 2009, and at the 39th Meeting of the Society for Biochemistry and Molecular Biology, Foz do Iguaçu, Brazil, May 2010.)
Compared to other Latin American countries, Brazil is the region’s “giant in every sense of the word” and has “the most sophisticated and diversified science, technology and innovation system” (Foreign Affairs and International Trade Canada, 2008). The country has the highest proportion of its gross domestic product (GDP) invested in research and development (The World Bank, 2007). In 2008, more than 50% of articles from Latin America published in journals indexed in the Thomson Reuters database were from Brazil (Brazilian Ministry of Science and Technology, 2009).
**High hopes for Brazilian science**

As President Lula prepares to leave office, researchers expect that innovation will invigorate the economy.

**BRASILIA, BRAZIL**

It is rare that a head of state ends a second term with approval ratings of around 80%. But when Brazilian President Luiz Inácio Lula da Silva took to the stage last month at a science-policy conference, his popularity was clear: more than 3,000 scientists, administrators and industrialists stood to applaud him and to cheer his science minister of five years, Sérgio Rezende.

With a government convinced that science is an essential part of a growing economy, Brazilian researchers have never known better times, and the 4th National Conference on Science, Technology and Innovation in Brasilia on 26–28 May was brimming with optimism for an even sunnier future. At the conference, Lula signed a series of bills that will help to sustain his legacy of science investment after he and Rezende leave office on 1 January 2011. The bills, if enacted by the National Congress, will increase funding for postdocs and establish three new biodiversity research centres, with the overall and a physicist at the Federal University of Rio de Janeiro. “The conference is the first time that those at the heart of science, and those tangentially involved, have all been brought together — and at a point when things are really taking off,” adds Carlos Henrique de Brito Cruz, the scientific director of FAPESP, São Paulo State's research foundation. The consensus statement, due to be published in two months' time, will be sent to all of the presidential candidates.

One prominent suggestion expected to be in the statement is the fostering of centres of excellence. “We need to look after our Pele as well as build more football pitches,” says de Brito Cruz. “The current focus of funding is on new centres, but there is no specific programme to fund research stars.” Another proposal is to provide more incentives for multinational companies to conduct research and development in Brazil.

These policies would build on a well-funded foundation. The Brazilian Ministry of Science Publications by Brazilians in peer-reviewed science journals have leapt from 14,237 in 2003 to 30,415 in 2008, according to data analysts Thomson Reuters.

This is impressive not only in the context of Latin America but also compared with Russia, India and China, for example. In 2000, Brazil generated 43% of Latin America’s peer-reviewed publications. Scientific output has since improved across the region, but in 2008, Brazilian publications made up 55% of the total. Brazil has particular strengths in agricultural science; for example, in 2000, a consortium based in São Paulo became the first in the world to sequence the genome of a plant pathogen, the bacterium *Xylella fastidiosa*, which destroys citrus crops.

Brazil spends significantly more per researcher than China or Russia, according to its science ministry. “I believe we have reached a point where the sector will grow organically,” says Rezende. “So the next person in charge will not have to do much.”
Brazilian science towards a phase transition

Ado Jorio, Francisco César de Sá Barreto, José Francisco de Sampaio and Hélio Chacham

The historical trajectory of materials science in Brazil shows the fast establishment of a high-quality, sizeable and productive scientific community. It is now time for a change in attitude towards real innovation and excellence.

Brazil’s population is close to 193 million, with 28.5% aged between 15–29 years old. According to the Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira, in 2008 more than 2,000 education institutions offered almost 25,000 undergraduate courses. More than 3 million seats are offered by selective processes in undergraduate programmes that have more than 300,000 professors. Most colleges are linked to the private sector (over 90%), while universities are evenly distributed between the public and the private sectors.

In 2009 there were over 4,000 graduate courses in Brazil, including 1,500 PhD programmes (34.4%) and more than 52,000 professors. At the end of 2009 there were 160,000 graduate students, 58,000 in PhD programmes; this number was below 1,000 in the early 1980s. Interestingly, there is a clear correlation between the number of PhDs and the number of articles published in journals with international circulation.
The discussion of research integrity (RI), which includes plagiarism, in Latin American science has received scarce attention, though awareness of its importance is increasing. However, **formal policies are not clearly established**, and Brazilian researchers, educators and policy makers have not engaged in the recent RI conversations led by the US and European countries.

“Brazil's scientific community is under pressure. Each year there is an increase in its contribution to international science and in the number of students who are trained to do research and teach at an advanced level. Most of these activities are carried out in state and federal universities... Interviews with graduate students, post-doctoral fellows and professors in one university department with a strong research tradition illustrate the level of stress engendered by the conflict between increasing competition and diminishing resources, and serve to underscore the negative effects on creativity and on the tendency to choose science as a career.”
Ethical aspects of doing and publishing research in Latin American science: Taken for granted???

What do 16 Brazilian senior researchers from leading public institutions say about plagiarism, for example?

Are these perceptions shared among graduate students and postdoctoral fellows?
Focus Group Interviews

Senior Scientists at Public Research Institutions (2008)

Graduate Students and Postdoctoral Fellows in Engineering and Biochemistry Programs at UFRJ (2010)

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Our Focus Group Interviews

- Plagiarism and the “Publish or Perish” Culture
- Perceptions of Plagiarism and Other Unethical Publication Practices
- Linguistic Competence to Publish in English

Sonia M.R. Vasconcelos
Our Focus Group Interviews

**Major Research Questions:**

- Is there any association between the “publish or perish” culture and plagiarism practices in the respondents’ views?

- Is the [Anglophone] concept of plagiarism clear cut among these respondents?

- Does lack of linguistic competence make researchers more tolerant of plagiarism?

- How familiar are these researchers with recent integrity (RI) policies established by the US and European countries?
The “Publish or Perish” Culture: Increasing Plagiarism Practices?

In a letter published in the Bulletin of the Brazilian Physics Society, a Brazilian scientist expressed his concern about the effects of the mechanics of “counting papers” on the Brazilian research environment (Oliveira, 2006)...may have detrimental effects on this environment and lead to unethical behavior in the Brazilian scientific community. (Vasconcelos et al, Embo Reports, 2009).
We noted the same feeling in the following comments from our focus groups:

“I think...publications, the demand for producing texts and patents...we’re overwhelmed by the mechanics of being productive; it’s something mechanical, and we end up...accepting things that used to be unethical but that have now become acceptable.”

“...this pressure for numbers and demand for quantity that has increased in the research environment...people do not have time to consider what makes a real contribution [to science]... this mathematization looks at [productivity] from a numerical perspective.”

* Comments from senior researchers in this presentation are published in Vasconcelos et al, *Embo Reports*, 2009.
“A student asked me to review her thesis. Sure, I was very happy to do so… It came to a point where I thought” I know this style… "And I went on reading… five, six pages from my own thesis! Had she copied that from someone else’s writing?… I’ve never met a situation like that; the really strange thing is that I talked to her thesis advisor, who considered the whole issue trivial …”

“… I don’t care… a paragraph from my thesis… [a student copying] not the whole thesis… but some paragraphs, I don’t care… Materials and methods? [Students] always copy and paste from other students…”

“… generally, students do not write well; many are poor and could not attend an English course [before entering university]. What do we have to do? Write for them? … When you tell them to do their own writing, many copy and paste.”
Linguistic Competence in English (Writing Ability) X Productivity and Visibility in the Web of Science

Complementary cumulative distribution function of researchers with different writing competences, good (black squares), reasonable (red circles) and poor (green triangles), according to number of papers.


Complementary cumulative distribution function of researchers with different writing competences, good (black squares), reasonable (red circles) and poor (green triangles), according to number of citations.
What do Graduate Students and Postdoctoral Fellows Say?

Overall, participants in this focus group noted that pressure to publish at university is not accompanied with guidance to help them to write their articles for international journals:

This is one the commentaries that express this feeling:

“... [I think that] not only here [at UFRJ] but also at other universities... in the scientific field, we do not have any guidance on scientific writing for publication... nobody taught us how to practice [academic] technical writing in English... nobody stimulated us to practice it [academic/technical English]. It is demanded that students publish, but ‘they’ [Programs/Institutions] do not provide the tools we need to have the ability to write an article... we write that way... we who have difficulty with the language [English], what do we do? [This situation]... is common: We get an article and write ours just like that... it [our writing] looks very similar.”
The same feeling was expressed by respondents from the focus groups with junior researchers in engineering (masters, doctoral students and postdoctoral fellows). Among the 17 participants, sixteen considered that textual plagiarism in science would be a less serious offense than copying data.

A doctoral student at the beginning of his/her project argued that “[Textual borrowing] from a paragraph in the introduction might be OK, but if you do that in the methods section or in the conclusion [it is more complex]…”

Another doctoral student at the end of his/her studies reasoned that “… one may find that the explanation [in the source] is so clear, so well written, that you cannot do differently… [if] one has difficulty with the English and makes a textual appropriation… is it scientific plagiarism?… don’t know the answer… but… for sure, stealing data is plagiarism.”

Among the 17 participants, two considered that reproducing the other author’s words as a means to explain a result, for example, even with a citation, turns the writing of science into a mechanical practice and, as one of them noted, could create “a tendency for [the author] not to be willing to reflect on [his/her own science]”.

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The concept of plagiarism appeared to be rather ill-defined among our respondents. Among the 16 participants, only two expressed the full definition of plagiarism, that is, including not only the use of someone else’s ideas and results without attribution but also inappropriate textual borrowing... Most respondents considered that textual plagiarism in science would be a less serious offense than copying data. In a recent article, Bouville claims that “copying a few sentences that contain no original idea (e.g. in the introduction) is of marginal importance compared to stealing the ideas of others.”

“To me, plagiarism is results, copying results...this already happened several times: You talk to somebody about the results you obtained and the person ends up developing the same...This is plagiarism. The same idea you had the person develops, right? Ideas: this is plagiarism. Only ideas...I have my doubts about the text...”

“To me, plagiarism in science is copying results, for sure ... [Plagiarism] in an article is... [When] you copy and paste an excerpt [sentence] larger than six, seven or eight words. I think you shouldn’t do that.”
These perceptions of plagiarism among graduate students and postdoctoral fellows in engineering reflected their definitions of plagiarism: When asked to define it, most of the respondents had doubts whether or not “words” would be part of the definition.”
Overall, participants viewed that textual borrowing in the introduction of an article would be less severe than in other sections. In fact, most agreed that textual plagiarism in an article would have “different levels of severity”. This idea has recently been raised in a *Nature editorial (8 July, 2010)*:

> Although the ability to detect plagiarism is a welcome advance, addressing the problem at its source remains the key issue. More and more learned societies, research institutions and journals have in recent years adopted comprehensive ethical guidelines on plagiarism, many of which carefully distinguish between different levels of severity. It is crucial that research organizations in all countries, and particularly the mentors of young researchers, instil in their scientists the accepted norms of the international scientific community when it comes to plagiarism and publication ethics.
A recent analysis turned up numerous examples of plagiarism on the arXiv server (see Nature 444, 524–525; 2006). Ginsparg says that it’s not uncommon for scientists with a poor command of English to plagiarize introductions or background paragraphs from earlier work, often adding an appropriate citation.” (Turkish physicists face accusations of plagiarism, Nature, 449, 8, 2007)

Borrowing sentences in the part of a paper that simply helps to better introduce the problem should not be seen as plagiarism. Even if our introductions are not entirely original, our results are — and these are the most important part of any scientific paper. In the current climate of ‘publish or perish’, we are under pressure to publish our findings...

“... the misappropriation of language from other authors has been noted and the trend is quite significant... this almost exclusively occurs when the principal, usually first named, author... does not have English as their mother tongue, and struggle to represent the background to their work in good English in the Introduction, or to explore articulately the significance of the results in the Discussion and Conclusions.” (Editorial, Biomaterials, 2007)

My experience with editing of hundreds of manuscripts has led me to believe that many researchers, at least in Iran, plagiarize because they simply do not know that it is an illegitimate act. Sometimes a non-native English speaking author may insert words or even sentences from a previously-published article simply because s/he is declined to sacrifice quality and accuracy of the work for want of linguistic expertise. (Editorial, Hepatitis Monthly, 8, 2008)
In Brazil, it appears that some cases of textual borrowing have been interpreted as editorial problems rather than academic plagiarism.

This interpretation reinforces the idea that there is a cultural component behind notions of plagiarism among researchers, which cannot simply be ignored.
“Steal my words, and you steal my authorship. Steal my idea and you still my identity as a scientist.”
(Laffolette, M.C., Proceedings of the Society for Experimental Biology and Medicine, 2000)
Are junior researchers from non-native English-speaking developing countries ready to meet the demands for originality set by the scientific community that mostly works in a English-only academic setting?

If not, is language asymmetries in the research community a relevant concern in RCR training?

Looking at different perceptions of RCR among junior researchers from different cultural settings is also relevant in this context.
Differences in National Approaches to Doctoral Education

Implications for International Research Collaborations

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International collaborations between researchers who have different views and expectations about research and publication ethics can easily lead to awkward misunderstandings. Cross-cultural problems in international collaborations have been discussed at length elsewhere (Global Science Forum, n.d.; Nature, 2008), and they should not be assumed to be irrelevant in the Brazilian scientific community.
Currently, what are the main challenges to develop RCR training for junior researchers in Brazil?

- Small number of professors involved in RCR initiatives. Consequently, junior researchers are not well informed on international discussions about RI.

- Research ethics at large needs more attention. Even bioethics training is not mandatory in most graduate programs in the biomedical sciences.

- Convincing researchers, educators and policy makers that engaging in RI initiatives and developing RCR training in the Brazilian research community are behind the times.
However, Brazil has the greatest potential to lead RCR initiatives in Latin America and play a more active role in the international dialogue on research ethics and integrity:

- The Carlos Chagas Filho Foundation for Research Support in the State of Rio de Janeiro (FAPERJ) has recently approved a 5-year fellowship for a postdoctoral research project focusing on developing RCR policies for graduate programs in the sciences through a pilot project at one of the biggest federal universities in the country.

- A distance learning course on research ethics, which includes a module on RI, has been developed by a group of Brazilian researchers (mostly working on bioethics), which has been coordinated by The National School of Public Health of the Oswaldo Cruz Foundation (ENSP/FIOCRUZ), a major research center in Brazil.

- The Brazilian Society for Biochemistry and Molecular Biology (SBBq) included a symposium entitled “Research Integrity: Is Plagiarism a Problem?” in its 39th Annual Meeting. The symposium encouraged discussion in the research groups of professors attending the meeting.

- After the end of the SBBq Meeting, the Society included recommendations for Brazilian graduate programs to include RI initiatives in their agenda. These recommendations are part of SBBq’s suggestions for the upcoming Brazilian National Graduate Program Plan (2011-2020).
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Muito obrigada!