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Comment

MASTER IN SCIENCE COMMUNICATION: AN OVERVIEW

Master's Degree Program in Scientific and Cultural Communication: Preliminary reports on an innovative experience in Brazil

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ABSTRACT: The multidisiciplinary Master's Degree Program in Scientific and Cultural Communication (MDCC) began in the first semester of 2007. It is offered by the Laboratory of Advanced Studies in Journalism (Labjor) of the Creativity Development Nucleus (NUDECRI) and by the Institute of Language Studies (IEL), both of which are entities the State University of Campinas (UNICAMP). The program is also supported by the Department of Scientific and Technological Policy (DPCT) of the Geosciences Institute (IG) and by MediaTec – Media and Communication Technologies Laboratory of the Multimedia Department (DMM) of the Art Institute (IA). The objective of the MDCC is to train and enable researchers with in-depth theoretical knowledge about current questions related to science communication. A global vision of the systems of science and technology are joined together with an understanding of a solid, contemporary literary and cultural repertoire. The interaction among subjects offered in the MDCC seeks to provide an education that allows critical reflection about the main accomplishments of science, technology and culture in our current society and the way in which the mass or specialized media have worked in order to communicate these accomplishments. The areas of research focus on the analysis of cultural production and science communication within the most diverse means of information, such as print, radio, television and electronic media. There is a special emphasis on areas such as science and technical history and the sociology of science, as well as other spaces of science and cultural communication, such as museums, forums and events.

1. Purposes and objectives

1.1 Scientific and Cultural Communication

In today's contemporary world, where scientific advances and technological innovations permeate political and commercial relations, the formulation of a science policy that assures reflection about national production and its competitive placement in the national and international market are an imperative that cannot be postponed. In this context science communicators who work at the interface between science and society have a unique responsibility. Having global knowledge of the S&T system in order to intervene through a critical perspective in the process of scientific production, in the policy of fund-raising and in the allocation of funding is essential to the practice of scientific journalism. Research on scientific journalism is just beginning in Brazil. It is therefore necessary for some concepts to cross over to university researchers in research centers who may work in the field, be it with the analysis of what scientific journalism and science communicators do or with the analysis of current advances in science and technology and their accessibility in present-day Brazil.

The social responsibility of journalists who specialize in covering scientific matters is great and needs to be shared with scientists. Both should work cooperatively, although not necessarily in complicity. The

objectives of one are not always compatible with those of the other. The democratization of scientific knowledge is part of the work of journalists, who should serve society and not scientists.

In Brazil, the marked regional differences reinforce the importance of scientific policy that takes the different national realities into consideration and that contributes to reducing these discrepancies. Even though the country has invested in the training of researchers in recent decades by starting graduate-level courses, the existence of isolated areas of excellence in Brazil's southern and southeastern regions demonstrates that knowledge is concentrated in these centers. Since the main means of communication and research institutions are located in these regions, scientific communication follows this same tendency in a process that constantly re-feeds distortion. Thus, public opinion, companies and the government are very rarely aware of the scientific production of those who are at the margin. The same is true with regard to developed and underdeveloped countries. A good part of science communication is still made up of materials and articles from foreign journalists or researchers that are translated, to the detriment of national S&T production.

Even in Brazil's great research centers, a great deal of scientific and technological production remains on the shelves of institutions – be it because of a lack of public knowledge or because of a lack of business and governmental awareness. There again lies the role of scientific journalists.

In the case of cultural communication, those who are responsible for occupying this space need specific training and preparation. This is required in order to constitute an effective space of critical language in the news that is not just a weak commentary of that which already exists within an academic setting. This space can serve not only as one to guide consumption and tastes, but it can also be a place of reflection that is aware of the specificity of the present's new objects. The reflective aspect of this specific training and preparation, which allows for being familiar with the dominant critical paradigms, is necessary in order for journalists to eliminate all involuntary comments from their discourse, rather than to reproduce said paradigms. For the greater objectives of science communication and reflection on the contemporary production of culture, this training and preparation should, in summary, take place through the practice of critiquing and describing contemporary objects and identifying the lines of power that cause tension in the cultural fields of the present, and through the practice of culturally intervening in texts that are accessible to non-specialized readers. The area of concentration in Cultural Journalism is proposed in order to organize the terms of continued education of professionals who have these characteristics.

1.2 MDCC Objectives

The objective of a master's degree in Scientific and Cultural Communication, as presented here, is to educate hybrid professionals who work with the idea of a global system of S&T and, at the same time, have enough cultural training to produce critical and reflective analyses of objects, be they S&T advances, the ways in which scientific communication itself takes place in our society, or current artistic or cultural events. The master's degree program has thus formed natural partnerships with the Laboratory of Advanced Studies in Journalism (Labjor), the Institute of Language Studies, and some professors and researchers from the Department of Scientific and Technological Policy of the Geosciences Institute and of the Multimedia Department of the Art Institute of the State University of Campinas (UNICAMP). Labjor also counts on the participation of scientists from UNICAMP and other universities who work in other fields, many of whom are already in agreement with the idea of this project.

Our main objective is to train researchers and journalists who are then able to dedicate themselves to a more in-depth study of scientific and cultural communication through different focuses, constantly searching for their interconnectedness. We do not intend to fall into the error of analyzing the critical and fragmented communication of the results of science and culture, nor the process of its production, which includes the different stages, difficulties and social motives. Rather, we intend to train professionals with the competence to discuss in depth the question of scientific journalism in our country and to carry out specific research in the field in order to contribute to a critical reflection with respect to the way that this important field of knowledge is being applied to Brazil.

Even though some similar successful experiences are being implanted in various countries (see for example the *Master in Comunicazione della Scienza,* da *Scuola Internazionale Superiore di Studi Avanzati* (SISSA), Trieste, Italy, http://jekyll.sissa.it/ilas/msc.htm), no master's degree program in Brazil has a similar nature. Here, the closest programs refer to some existing academic experiences, in the form of specialization courses, in the area of scientific journalism. Although they have been successful, these

courses are still few in number. An example of one of these successful experiences, which has played a founding role in academic and professional educational activities in the field, is the UNICAMP specialization course offered by Labjor, the Department of Scientific and Technological Policy (DPCT) and the Multimedia Department (DMM).

It is this experience of the non-academic specialization course in Scientific Journalism that has served as a basis for the proposals and objectives of building a unique master's degree program in Brazil. The same philosophy has been followed as that of the specialization course, thus bringing together the provocative partnership of different fields of knowledge and making use of the active participation of journalists, scientists and art and literary critics.

MDCC intends to contribute to the students' ability to understand the role that science and culture play in the country's social context in order to have more efficient communication of its production. Through use of the media, the program also intends to provide a critical evaluation of the country's S&T policy and of market culture communication. It is also hoped that students will be provided with a solid basis in the current discussions about scientific and cultural communication. Based on the convergence of the experience of scientists, journalists and critics, it is hoped that students will be provided with a relevant and creative perspective of the communication of their work and that journalists will be provided the chance of working adequately with the complex questions of science and culture.

2. Historical perspective

The interest that science arouses in the lay public is great. The number of magazines available in newsstands that specialize in the matter and the debates that have recently begun with "discoveries," such as those of cloning, are indicative of such interest. However, the situation which was pointed out by José Marques de Melo at the end of the 1970s continues to hold today: "If Brazilian universities already maintain specific channels and activities for the communication of the science produced in their laboratories and research institutes, it is sad to note that interest in popularizing science still has not developed adequately in the journalism programs maintained by these same universities."[*]

It was in this perspective that Labjor created the non-academic Specialization Course in Scientific Journalism in 1999. The objective was to equip journalists and researchers who want to work with scientific journalism and/or scientific communication with a set of indispensable tools.

Since the beginning, the idea has been widely accepted. The Specialization Course in Scientific Journalism was first offered from March of 1999 to June of 2000. Of the 145 candidates for the 30 vacancies announced, 40 students were admitted. Of these, 32 concluded the course, completing all the credits and course subjects. Among the 40 who were selected, there were: 19 journalists and 21 scientists (7 biologists, 3 chemists, 2 biochemists, 2 engineers and 1 each from the fields of biomedicine, geology, anthropology, dentistry, veterinary sciences, sociology and agronomy). The program was offered for the second time in March of 2001 and ended in July of 2002. We had 214 candidates. 46 students were accepted, coming from the following professions: journalists (22), social scientists (3), geologists (1), doctors (3), physicists (3), biologists (3), lawyers (1), biochemists (4), biomedics/nurses (2), engineers (3) and nutritionists (1). Of these, 39 completed the program.

In the third group, which began in March of 2003, there were 229 candidates. 119 were selected for a second phase of the selection process. Of these, 47 were finally chosen to make up the new class. In January of 2005, registration was opened for a fourth class. 307 candidates applied. 117 were selected for the second phase and 52 were finally chosen to participate in the program. For the fifth class, with coursework beginning in March of 2007, 273 candidates applied. 60 were chosen to participate in the program. More details may be found at http://www.labjor.unicamp.br/cursos/pos.htm. The students' differing levels of academic training, ranging from recent graduates to senior professors, also contributes greatly to the richness and diversity of the learning experience developed throughout the course's three semesters (see the complete class profile at http://www.labjor.unicamp.br/cursos/turmas_pos.htm).

The program is free of charge and has a duration of three semesters, with full-day classes on Mondays. The selection process (the next one scheduled for the end of 2008) is made up of an essay and CV analysis in the first phase, and a written test, English proficiency exam and interview in the second phase.

[*] Melo, José Marques de. "O Jornalismo Científico na Universidade Brasileira - anotações de um observador participante", in Congresso Ibero-Americano de Jornalismo Científico (4a edição), São Paulo, 1982; pp. 369-379.

The objective of the program is to provide professional journalists and scientists with skills for scientific communication, with the intention of making the S&T debate public and reducing the gap between scientific knowledge and people's everyday lives. For scientists this is an opportunity to obtain training, which is not included in undergraduate programs, aimed at research communication. For journalists, the program can contribute to a better understanding of the process of science production as well as national scientific policy.

In addition to the program's course subjects, students participate in seminars and lectures with journalists and scientists who work with scientific communication. Other activities offered include workshops on scientific journalism and multimedia, allowing students to have contact with practical communication exercises in diverse types of media.

The magazine ComCiência (http://www.comciencia.br) was created in order to make the interaction among the group's participants even more dynamic and also in order for activities to be more visible and provide professional practice. Beginning with the first class of students, the magazine has served as a laboratory for students and an effective means of scientific communication. Its success led to it becoming a publication in partnership with the Brazilian Society for the Progress of Science (SBPC), which occurred in June of 2001 at the Society's annual meeting in Brasilia. Since the magazine's creation, the average number of daily visits to its site has grown each year. The monthly average of visits to ComCiência in 2007 reached the excellent mark of 500,000.

3. Justification and objectives

It is not by chance that the gradual conquering of space of Brazilian scientific production in the media has been accompanied by the advance of research carried out in universities and research institutes. Since the beginning of the 1980s, it has also been accompanied by the implantation of graduate-level courses in Brazil. More specifically, the first steps in scientific journalism in Brazil were taken at the end of the 1970s – the same year in which Manuel Calvo Hernando came to lecture at the University of São Paulo's (ECA/USP) extension course. Some researchers at the University of São Paulo began devoting themselves to the topic. Vera Lúcia Salles de Oliveria did a biographical study on João Ribeiro, Wilson da Costa Bueno concluded his doctoral dissertation on scientific communication in the Rio de Janeiro and São Paulo press, and Magali Izawa studied the scope of scientific news in Brazil's daily press.

The journalistic value of scientific communication began to have greater recognition as scientists began to participate more actively in policy decisions. Scientific news began to arouse greater interest in society and to merit media attention. However, at the same time that the mass means of communication began to increase the publication of science materials, errors and distortions about information on S&T also grew.

On the one hand, journalists decided to communicate articles written by scientists or various authors. Therefore, journalistic criteria did not always take part in the profile of the publication. On the other hand, the lack of professionals specialized in scientific coverage obligated the editors of this emergent field to relocate journalists from other sectors who had an interest in covering science but who did not have the specific knowledge for this complex field of journalistic coverage. The non-existence of specialized courses in scientific journalism forced professionals to almost always revert to self-taught training. This process has been occurring in a disorderly fashion, without a complete awareness of the knowledge necessary for the area.

Because of personal achievement on their part, some journalists have managed to overcome their difficulties and carry out competent coverage. Most times, however, they lack a critical view of the information that they print, with all of the risks inherent in this form of communication. At times, scientific journalists are instructed by the scientists themselves, who are interested in personal gains. Others limit themselves to the reproduction of a scientist's discourse, albeit correct, without putting it into context or placing it in contraposition to other discourse, when dealing with matters of a polemic nature. The urgent characteristic of publication in daily journalism does not collaborate with the rigor necessary for transmitting information in general. In the scientific field, where some errors can harm years of work as well as the image of a serious scientist, this is even truer. This does not even include the sensationalistic coverage of some journalists, who at times distort research content or only privilege "great discoveries". It is important to point out that, in science, research that is considered "lesser" can have as much importance as mega-projects.

This set of factors causes the communication of science to often seem full of impropriety, thus making it difficult for the lay public to understand. It also contributes to scientists not being interested in giving interviews to the press and preferring to only communicate the results of their production in conferences and specialized magazines.

The Master's Degree Program in Scientific and Cultural Communication has the intention of training researchers in scientific and cultural communication who are then capable of:

- studying and discussing questions of scientific and cultural communication;
- democratizing scientific and cultural knowledge;
- discussing the country's scientific and cultural policies in a critical way;
- contributing to the communication of scientific and cultural production in peripheral areas;
- reducing the gap between public opinion and those who create knowledge;
- establishing a relationship between scientific and cultural production and daily life and its relations with society in general;
- making the understanding of science and culture phenomena possible;
- reconciling critical and scientific rigor with journalistic language;
- making scientists and cultural critics aware of the communication of their production;
- contributing to a critical reflection about scientific and cultural knowledge that is produced in the country.

4. Course description

The Master's Degree Program in Scientific and Cultural Communication intends to contribute so that students are capable of understanding the social role of science and culture in the country, in order to have more efficient communication of their production. The program also intends to provide a critical evaluation, through use of the media, of the country's S&T policies, and of market cultural communication. There is also the hope of providing students with a solid basis in the current discussions about scientific and cultural communication. Based on the convergence of scientists' experiences, journalists and critics hope to make it possible for those in the academic world to have a relevant and creative perspective about the communicating of their work. It is also hoped that journalists will be given the chance to work through the complex questions of science and culture adequately.

The program has a mandatory component, which is made up of a minimum of two (2) courses related to the main concepts of this multidisciplinary program, and an elective component, which is composed of two (2) courses from a list of subjects offered or, in accordance with the suggestions of the orienting professor, courses offered at UNICAMP that are adequate for the students' specific field of research. By the end of the first year, students should completely define their area of interest and, within that area, elaborate and present their thesis project, with the help of an orienting professor.

4.1 Curricular structure

The coursework of this master's program is divided into two groups:

1. Mandatory courses
   All master's degree students should, as a requirement, take two courses from this group.
2. Elective courses
   All master's degree students should, as a requirement, take two courses from this list or, in agreement with that suggested by the orienting professor, they should take courses offered at UNICAMP that are relevant to their field of research.

Courses offered in Group 1:

JC 001 – Science, Technology and Society
JC 002 – Literature, Culture and Society
JC 003 – Current Topics in Science and Culture
JC 020 – Text and Language

COURSES	SUGGESTED SEMESTER	TOTAL HOURS (h)
Gruop 1 – Mandatory 1	First Semester	60
Gruop 2 – Elective 1	First Semester	60
Gruop 1 – Mandatory 2	Second Semester	60
Gruop 2 – Elective 2	Second Semester	60
Research only	Third Semester	
Research, writing and thesis	Fourth Semester	
Total		**240 h**

Table 1. Suggested Timeline for Program Completion.

Courses offered in Group 2:

JC 004 – History of Science and Technology
JC 005 – Language: Journalism, Science and Technology
JC 006 – Sociology of Science
JC 007 – Cultural Studies of Science
JC 008 – Current Topics in Scientific and Cultural Journalism
JC 009 – Guided Reading
JC 011 – Multimedia Workshop
JC 050 – Scientific and Cultural Journalism Workshop
JC 101 – Topics in Scientific Communication
JC 107 – Topics in Cultural Communication
JC 111 – Topics in Scientific Methodology
JC 112 – Topics in Brazilian Literature

4.2. Research Areas

The research areas in which students can develop their master's theses are indicated below and are related to the area of concentration in a flexible manner, given the intrinsically multidisciplinary nature of the program. The research projects to be developed by the program's professors are also linked to these same research areas:

1. Scientific Culture
   Studies of science communication and of the relationships of science with society. Studies about scientific journalism in the most diverse forms of press and media (radio, television, electronic and print). Research on the history of science and technology and the sociology of science, as well as studies of science communication activities in museums and science centers and other non-formal educational institutions.
2. Literary Culture
   Studies on cultural and literary production. Investigations into literary journalism in the most diverse forms of press and media (print, radio, television, electronic). Reflection on the contemporary production of culture, through the practice of critiquing and describing contemporary objects, the identification of power lines that create tension in present-day cultural fields and the practice of cultural intervention.
3. New communication media
   Studies on scientific and cultural communication in innovative media, with special emphasis on points of convergence in medias.

4. Public perception of science and technology
   Research of public perception of science and technology, including opinion research, qualitative research, the presence of science and technology in the media, construction and analysis of indicators and research projects that demonstrate an understanding of science and technology.

4.3 Profile of graduates

Occupational Profile

- University professors
- Journalists
- Editors
- Researchers working in research centers, museums and governmental organizations
- Press advisors for universities and research institutions
- Scientists interested in writing for the media or in writing books for communication purposes
- Specialized reporters

Technical Profile

Professionals trained to:

- teach courses related to Scientific and Cultural Journalism (SCJ) at undergraduate and graduate levels
- carry out research in the fields of SCJ and scientific communication
- write reports and articles about science and S&T policy
- write reports and articles about cultural events, accomplishments and policies
- write communication articles for specialized journals
- elaborate institutional plans for science communication (communication consultants)

Professional profile

It is hoped that journalists/scientists will be led to:

- perform the role of scientific educators;
- perform the role of cultural communicators and critics;
- make the debate about S&T public;
- reflect on scientific and technological policy;
- think of their work in its ethical and social dimensions.

4.4 Faculty

Considering the intrinsically interdisciplinary nature of this master's degree program, the faculty is made up of renowned professors from various fields of knowledge who naturally develop research in areas that are related to the areas of research offered by the MDCC. Within the complete list of professors and mentors, there are professors from the fields of Languages and Linguistics, Journalism, Education, Geosciences, Multimedia, Philosophy, Physics, Biology and Medicine, among others. For a complete list of the faculty and their profiles, see http://www.labjor.unicamp.br/cursos/docente_mest.htm.

Conclusion

The MDCC is a graduate-level academic program that is structured around the idea that science and culture meet at the junction that the concept of scientific culture – present in the program's conception – brings about for the activities of scientific and cultural communication.

These activities, which are aimed at teaching, research and other different institutional actions related to extension, seek to motivate society in general – and within society, youth in particular – to love knowledge. In this way, youth become ones who love science and culture today because of initiation practices. In the future, they become transmitters of the eternal youthfulness that cultural and scientific knowledge provides to all ages and in all circumstances.

Translated by Robert Gartner

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Carlos Vogt**,** poet and linguist, was born in Sales Oliveira, in the State of São Paulo. He holds several academic titles, including: Master of Arts from the University of São Paulo; Master in General Linguistics and French Stylistics, in France, and Doctor of Science from Unicamp. In 2005 he was awarded the distinction of Order of Scientific Merit, by the French President of the Republic and the title of doctor honoris *causa* from the École Normale Supérieure in Lyon. He is Full Professor in the area of Argumentation Semantics and coordinator of Unicamp's Laboratory for Journalism Studies. He has international academic experience in France, the United States, Argentina and other countries. He was Rector of Unicamp from 1990 a 1994 and vice-president of the Brazilian Society for the Advance of Science (SBPC) from 2001 to 2005. He has published several books, among which: *Percepção Pública da Ciência*, in collaboration with Carmelo Polino - orgs. (Ed. UNICAMP e FAPESP, 2003); *Poesia reunida* (Landy Editora, 2008); *Ilhas Brasil* (Ateliê Editorial, 2002); *A imprensa em questão* (co-author, Ed. Da Unicamp, 1997); *Mascarada* (Pontes e Ed. da Unicamp, 1997); *Cafundó – A África no Brasil* (co-author, Companhia das Letras & Editora da Unicamp, 1996); *A Solidez do sonho* (Ed. Papirus e UNICAMP, 1993); *Os melhores poemas de Guilherme de Almeida* (Selection and Commentaries, Ed. Global, 1993); *Metalurgia* (Companhia das Letras, 1991); *Linguagem, pragmática e ideologia* (Hucitec, 1989); *Crítica ligeira* (Ed. Pontes, 1989); *Nelson Rodrigues* (co-author, Ed. Brasiliense, 1985); He has published numerous articles and essays in newspapers, magazines and specialist national and international publications. He is editorial director of the magazine *ComCiência,* a monthly electronic publication found at http://www.comciencia.br. Former editor in chief of *Ciência e Cultura*, the magazine of SBPC, he is actually editor in chief of the magazine *Conhecimento e Inovação.* He was president of the State of São Paulo Research Foundation–Fapesp (2002-2007). Currently he is Secretary of State for Higher education for the State of São Paulo. E-mail: cvogt@uol.com.br

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