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CONCEPTIONS OF PUBLIC COMMUNICATION OF SCIENCE BY COORDINATORS OF GRADUATE PROGRAMS IN PUBLIC HEALTH

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ABSTRACT

Scientists communicate with their community with a specific scientific language code. Each field of science develops its proper hermetic code of scientific language, which is not accessible to non-pairs. We live in a historical cultural moment in which countries, particularly those with a reasonable scientific development, became knowledge societies in which citizens must participate in the processes of decisions about scientific politics. Thus, information on scientific research must be communicated in language accessible to the ordinary citizen. What is the understanding that scientists have about the communication of science to society? This is a report of an exploratory, observational research, with analytical and descriptive characters which aimed to understand what scientists understand as public communication of science. The conception of public communication of science by the participants of this research is not unanimous. The comprehension of public communication of science as a social right and as a commitment of scientists is not explicitly present in the narrative of the coordinators of graduate programs in public health in Brazil, subjects of this research, although in general, the coordinators conceive it as a relevant activity.

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INTRODUCTION

The implantation of the university in Brazil has a relatively recent history when compared with its European counterparts and even with those of South America, such as the San Marcos University of Peru, founded in 1551 and the University of Cordoba in Argentina, which began its activities in 1613. Until the 1920s, higher education in Brazil was provided by independent colleges and isolated faculties. In 1968, a process of reform of the incipient university in the national territory (Fávero, 2006) began, consolidating a model of university education supported by the triad: teaching, research, and extension (Cury, 2004). It should be noted that (Volpato), treats the university as supported by a quadruple conjuncture because it adds to the previous triad Administration/Management. However, he asserts that administration and extension are not expected to be the main target of a university professor's activities. The necessary purposes consist of teaching and research (Volpato, 2009).

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Although Brazilian university history is recent, with a consequent history of recent scientific research, studies point to the growing development and increase of visibility of Brazilian research both in the context of the South American continent, where it occupies a leading position (Meneghini *et al*, 2006), (Packer and Meneghini, 2007), (Meneghini and Gamba, 2011). Basalla (1967) elaborated a model that explains the introduction of modern science in non-European nations from an original axis of Western European nations during the sixteenth and seventeenth centuries, which runs through the scope of the university and graduate programs. According to this author, the diffusion of science was carried out in three phases. In the first phase, peripheral countries, where there was no modern science, were "visited" by Europeans as the object of scientific research. In the second phase, dependent science developed anchored by foreigners and nationals, based on a foreign scientific culture. Already in the third stage, independent science is established as definitive. The beginning of the postgraduate expansion in Brazil is contextualized according to Vargas, in the third phase of the Basalla model, and corresponds to the period marked by the development of national science:

One could ... defend the thesis that the third phase of scientific development would have begun in Brazil, around 1960, with the institution of graduate courses in our universities. Evidently, it is possible that the scientific contribution has been reduced to a level when the research is established here, a master's or doctoral level, by students, not yet properly prepared, replacing teachers prepared and guided by foreign sources. But without doubt, the characteristic of independence was gained, which is necessary in order to achieve value later, maintaining the independence characteristic of the third phase (Vargas, 1994, 285). It should be noted that in Brazil the researches, particularly those of a scientific nature, have been projects linked mainly to public (or state) universities (Fava-de-Moraes and Fava, 2000), subsidized by taxes paid by citizens (Oliveira Filho *et al*. al., 2005). In Brazil, investment in research by private institutes, schools and universities are still scarce. Giannotti (1986) and Chaves (2010) criticize a degradation of higher education and academic research in public universities not compensated by a supposed improvement in the private network. It is through the body linked to the Ministry of Education of Brazil, the Coordination of Improvement of Higher Education Personnel (CAPES) that is the standardization of the scientific production of Brazilian universities. According to the document, National Graduate Plan (PNPG), it is possible to verify that scientific research in Brazil occurs mainly in postgraduate programs, "the data available demonstrate, above all, that it is within the National System of Post -Graduation that basically occurs the activity of Brazilian scientific and technological research "(PNPG 2005-2010, p.8). The most recent National Graduate Plan, PNPG 2011-2020, confirming the vocation of the Brazilian university, and consequently of its graduate programs to research, adds the following information: "... the reality in the country show that masters and doctors work primarily in universities, about 66%, and only 26% in companies. In Korea, Japan, and the United States, the reverse is true, and this number does not exceed 7% of researchers working in universities and is close to 70% in companies" (PNPG, 2011-2020, 276). This reality makes us consider the outstanding importance of universities and graduate programs for the process of Brazilian scientific and technological production. Thus, in other countries, the importance of market laws stands out as an endorsement of the survival of companies doing research. In Brazil, it is the taxes of citizens that subsidize academic projects.

In the book "University and Communication in the Building of Society", published in 1992, Kunsch highlights the fundamental role that a communication office has in a university in order to fulfill its mission. In their study, it is highlighted the fact that most Brazilian universities were not aware of the need to establish an integrated communication that would allow the effective diffusion of their scientific production. A specific section of the book that deals with the proposition of the university's mission aroused interest and motivated the research addressed in this study.

Kunsch (1992) states that: In the world in which we live today, the university has not only the duty but also the social responsibility to produce its research, openly, to the whole society. There is no justification for a scientific production cloistered in archives and shelves, with restricted access of a privileged minority. It is necessary to democratize the university. ... [it is necessary] ... the opening of new channels of dialogue and democracy inside and outside the university. This is an urgent task of the university (Kunsch, 1992: 27).

The hypotheses supported by this study start from the assumption that the Brazilian university has not yet fully fulfilled its "urgent mission", particularly with regard to communication with society, sharing with society the scientific production generated on its bench. At the time of Kunsch's study, Brazil had 84 universities, 29 of which participated in the survey. Today there are more than 200 universities in the country, between public and private institutions. It was not intended to repeat the study of this researcher, but it was proposed to study a segment of the graduate program, the Graduate Programs in Public Health. The process of Brazilian university reform, initiated in the late 1960s and early 1970s, favored graduate studies as the source of national research and consequently generating scientific knowledge. With the encouragement and need to develop a national science, there is an exponential growth in the number of graduate programs and courses in Brazil. The numbers of graduate programs increase each year. The option to work with the graduate programs in Public Health in Brazil is due to the fact that the knowledge production of these programs is related to the planning and implementation of policies that aim to reach the enlarged society and that, therefore, to these programs to develop communication policies capable of sensitizing, mobilizing and integrating citizens with the specific objectives of the public policies proposed by them.

MATERIAL AND METHODS

The data collection was divided into two phases and the subjects of the research were coordinators of graduate programs in public health of Brazil. The search was concentrated at the field of public health because coordinators of academic graduate programs in public health are ultimately key informants of scientific research, whose nature is the health of the population and whose purpose is the development, analysis or review of public policy which must, by its essence, to contemplate the process of social participation with a view to changes in habits and behaviors of individuals or collectivities. Having this as a principle, it becomes essential the democratic and dialogic interaction between formulators of policies and the target audience, which is the population as a whole. Two questionnaires were applied in two semestral meetings of the Brazilian Collective Health Association (ABRASCO) that bring together coordinators of graduate programs in public health of all Brazil. Thirty-one of 43 coordinators responded to the first questionnaire, and 20 of 41 responded to the second questionnaire. The questionnaires were applied in a six-month interval. At the time of data collection there was in Brazil 54 graduate programs in public health, belonging to 35 institutions of higher education, 29 public universities and six private institutions, that offered 72 stricto sensu courses, 36 masters courses, 15 professional master and 21 doctoral courses. Results and discussion related to the coordinators' responses were organized taking into account the reference of Content Analysis (BARDIN 2011, LASWELL 1971, HENRY and MOSCOVICI 1968, OLABUENAGA and ISPIZUA, 1989, MINAYO 2004). The conceptions of the coordinators about public communication of science: meaning, relevance, importance in potential and personal significance and participation in activities/actions of scientific dissemination, were analyzed following the different steps recommended by experts that guide the content analysis

methodology. In the first phase, the phase of the pre-analysis, corresponding to the organization of materials and systematization of the ideas, it was processed the "floating reading", the first reading of the texts produced by the subjects. These texts were the documents selected for examination. It was worked concurrently the hypothesis and the initial objectives of research related to the material collected. It was assumed that the subject of the public communication of science, from the perspective of science dissemination, consisted of a fledgling approach, without knowing exactly what would be the level of depth of these approximations. Established as objectives the propositions to characterize and understand the concepts of the coordinators of the thematic related to scientific dissemination.

At that time began to work the software feature CHIC ® as an aggregator of value to the processing of data collected in the questionnaires applied to the coordinators. The second phase of Content Analysis is the exploration of the material. At that time began the codification process of the raw data of the texts written by the coordinators in answers to questions in the questionnaires. With this procedure sought to reach the core of understanding of texts. This phase, painstaking, involved the clipping procedures, counting, sorting, and enumeration taking into consideration the rules of the content analysis previously mentioned. Finally, sued the third and last phase of content analysis, which corresponds to the treatment of the results obtained and its interpretation. The raw data, first turned to presence or absence data were submitted to the operationalization of CHIC ® software, in order to become meaningful and valid and to highlight the information obtained. This operation allowed the proposition of inferences and interpretations according to the theoretical framework and objectives proposed.

Two types of analysis can be processed on content analysis, thematic analysis or by category or evaluation analysis or representational. It was opted for the thematic analysis-categorial, this is the most widely used technique in studies using Content Analysis. This kind of analysis is to break up the text operations in units (categories), second analog groups. It aims to discover the nuclei of meaning that make up a communication, worrying about the frequency of these nuclei, in the form of segmentable and comparable data. According to the methodological assumption of Content Analysis, the text reveals the context, which means that textual production is revealing of the opinions and personal beliefs of the subject. The script here described was based on Cappelle *et al* (2003).
A summary of the applicability of the Content Analysis in this research, the data were organized in four sections: conception, relevance, importance and personal meaning, referring to the subject of public communication in the context of scientific dissemination and its insertion in the Graduate Programs in Public Health of Brazil and the personal involvement of the coordinators in related activities. The method used to analyze the data, coordinators' answers to the questionnaire questions, was thematic-categorial, indicated by Bardin (2011), Oliveira (2008) and Campos (2004). The theme is understood as the unit of meaning that stands out from the content of the text analyzed according to criteria related to the technique of Content analysis (Bardin, 2011). The information obtained from the Coordinators' responses was analyzed using the resources provided by CHIC® software, developed in the early 1990's by Régis Gras and associate researchers, with the purpose of synthesizing and structuring responses in obtaining a typology of behaviors, provided by the multidimensional treatment of statistical data: The CHIC® software has the essential functions of extracting from a data set, by crossing subjects and variables (or attributes), rules of association between variables, providing a quality index of association and representing a structuring of the variables obtained through these rules. (COUTURIER *et al* 2004: 1). Although CHIC® software can work with binary variables, frequency and interval variables, in this study its use was limited to the use of binary variables and the association between them studied by the degree of similarity and implication. According to Couturier *et al* (2004: 18 and 20), both the criterion of similarity or statistical similarity between variables and the implication index are based on the crossing of variables, in this study corresponding to categories obtained from the Coordinators' responses to the questions and a set of subjects (Coordinators). According to Almouloud (2005): [...] the hierarchical analysis of similarity allows to constitute, by means of a criterion, ever thinner partitions on a set of statistical variables. Such partitions are constructed upwardly in a tree allowing to study and interpret, in terms of typology and similarity (dissimilarity), classes of variables. In the implicit analysis of the data, one arrives at implied structures in the sense that an attitude a has as consequence, or not, an attitude b (a → b), (ALMOULOUD, 2005, p.3). The significance units treated as variables to be analyzed were transposed to the Microsoft Excel (Microsoft Office for Macintosh) spreadsheet editor, "csv" format, to suit the database for processing and analysis by the CHIC® software (version 4.1). The "csv" format technically corresponds to the universal file-sharing format between different programs, based on comma-separated values. The variables were processed by the CHIC® software, which allowed the mathematical analysis to interpret the data obtained (Hierarchical Classification Analysis of Similarity and Implication).

Presentation of Hierarchical Similarity Analysis Data

The results are presented by the hierarchical tree images generated by the CHIC software (GRAS and ALMOULOUD, 2002), which describe hierarchical classes and subclasses according to the degree of similarity ≥ 0.50 and ≤ 1.0 among the analyzed variables (Figures 1 to 4). The results are presented in the hierarchical order of degree of similarity, following from left to right. In the hierarchical analysis of similarity of coordinator's responses, data with significant consistency and objectivity were found to describe the results found with a degree of similarity from 50% (≥ 0.50). In the hierarchical similarity analysis of PPGSC coordinators' answers about the conceptions of scientific dissemination, data with significant consistency and objectivity were found to describe the results found with a degree of similarity between 59% (≥ 0.59) and 99% (≥ 0.99). In the hierarchical similarity analysis of Coordinators' responses on the relevance of scientific dissemination to the programs they coordinate, data with significant consistency and objectivity were found to describe the results with a similarity between 69% (≥ 0.69) and 96% (≥ 0.96). In the hierarchical analysis of similarity of the PPGSC coordinator responses to the importance of the scientific dissemination should / could have as a policy for the programs they coordinate, data were found with significant consistency and objectivity to describe the results found with similarity between 85 % (≥ 0.85) and 98% (≥ 0.98). In the hierarchical similarity analysis of Coordinators' answers about

the meaning of participation in scientific dissemination activities/actions, data with significant consistency and objectivity were found to describe the results found with a degree of similarity between 92% (≥ 0.92) and 96% % (≥ 0.96).

Presentation of Implication Analysis Data

When processing the data by the implication analysis, a graph was formed (figure 5) that contains vectors that indicate the strength of the correlation between the analyzed variables. The vectors displayed by the CHIC® software specify the implication index ≥0.50 and ≤ 1.0, where one variable is associated (implied) with the other (COUTURIER *et al*, 2004). In the analysis of the implication of PPGSC coordinators' answers about the conceptions of Scientific dissemination, data with significant consistency and objectivity were found to describe the results found with a degree of implication (confidence index) between 72% (≥ 0.72) and 98% (≥ 0.98).
Following the questions that integrated the two questionnaires, in the first one was only the first question in the list that follows, the other information from the first questionnaires dealt with data related to the Graduate Programs in Public Health:

- For you what is Scientific Dissemination?
- How relevant is the Scientific Dissemination to the Program you coordinate?
- What importance could Scientific Dissemination have as a communication policy for the Program that you coordinate?
- Where did the initiative of the experiences with public communication start? External Initiative? Were you sought by an outside source? Personal Initiative? Another answer? To specify.
- What was the significance of these experiences in your personal/academic life?

RESULTS

The data collected resulted originally in 10 tables, in which it was possible to synthesize the results of thematic-category analyzes. In four tables it was registered the Context Units, the Registration Units and the Units of Significance with the names assigned to each of the variables. They refer to the Coordinators' conceptions regarding Scientific Dissemination, corresponding to the answers of the four questions contained in the two questionnaires to which they answered. Four tables were prepared to record the presence or absence of the variable (corresponding to the Unit of Significance) in the corpus of the Thematic-Categorical analysis, corresponding to the Coordinators' conceptions of Scientific Dissemination.

Thirty-four Units of Significance were constituted from the Content Analysis of the answers that the Coordinators gave to the questions contained in the two questionnaires concerning the conceptions of scientific dissemination. A table was prepared to present a list containing the Variables corresponding to the Units of Significance. And a table, that follows, to present the redistribution of the categorized variables that were associated with the six major themes that encompass them.

Table 1. Redistribution of categorized variables associated with the six major themes

N	THEMES	Associated Variables
1	Scientific Dissemination understood as communication of results independent of the form of transmission: Diffusion. It includes communication using any vehicle and in both the format of academic communication and public communication in accessible language.	Difusão resulta produc
2	Scientific Dissemination as an expression of scientific communication between peers and academia - dissemination. The concept of Scientific Dissemination, expression of popular communication, appears implied to the scientific communication, as well as appears jointly implied to the communication directed to the academy implied to the scientific communication. When this theme is established, dialogue with communication takes place within the academy. This theme runs under different variables by all the Coordinators' answers, corresponding to the five main questions of the questionnaires that were applied.	Dissemina metodol Comucient comacad Cogest copares gest Relaçaopares eventos Pares gestores
3	Scientific Dissemination as an expression of a communication directed to the enlarged society. The variables that belong to this theme correspond to the same ones that are related to the theme "Rights of the population to scientific information". The differentiation is made regarding the analysis and interpretation that, in this case, per passes by the question of the rigor of the terminology. The discussion takes into account that the variables identified as belonging to this theme correspond to an appropriate use by the Coordinators when they refer to the Scientific Dissemination in the context of a communication directed to the extended society.	Divulga tradcompr socampli funcsoc cosocied comprom socied dialog
4	Rights of the population to scientific information. Although the variables that compose this theme are the same as those that make up the theme "Scientific Dissemination as an expression of a communication directed to the enlarged society", the question of the relevance of this theme consists in the fact that it is related to the context of the so-called rights of 4th. generation (which includes the right to information).	Divulga tradcompr Socampli funcsoc Cosocied comprom Socied dialog
5	Conflicts and interests related to Scientific Dissemination. The translation of scientific language into the common language, accessible to the enlarged population, is liable to the conflicting obstacles between mediator and researcher. Researchers mostly operate a communication that follows the theoretical model of scientific communication that is more objective, controlled, vectorially unique, that has no return - transmission of information, of knowledge. Popular communication is a form of communication that occurs as a scientific communication that establishes this thematic that is marked by the conflict. Paulo Freire and dialogical communication.	Comupop politic avalia comunic preomidia
6	Meaning of involvement in scientific dissemination activities/actions Being involved in activities of Scientific Dissemination means to take on new commitments that are outside the routine of the professional responsibilities, nevertheless represent and in general, for those who have been involved with these activities something significant.	Algrelev muirelev Satisfaçao reconhecimento

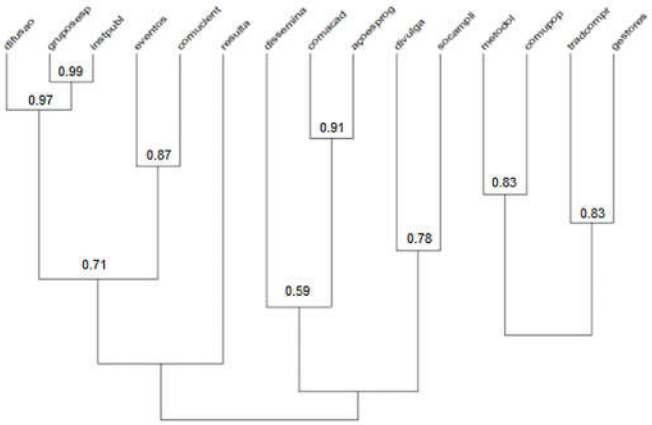
- In the last three years (2008-2010), have you participated in any public communication / scientific outreach experience as a teacher and as a researcher? Yes? No? Why not?
- Which vehicles were used in the experiments with public communication: Radio, TV, Magazine (Non-scientific) Internet, Lecture, Other, Which?

This table identifies the six themes: (1) Scientific Dissemination as an expression of scientific communication between peers and academia - dissemination, with 11 associated variables; (2) Scientific Dissemination as an expression of a communication directed to the enlarged society, with eight associated variables; (3) Rights to scientific information, with eight associated variables; (4) Conflicts and

interests related to Scientific Dissemination, with five associated variables; (5) Scientific Dissemination as communication of results independent of the form of transmission; (6) Meaning of involvement in scientific dissemination activities/actions with four associated variables.

RESULTS OF SIMILARITY ANALYSIS

Figure 1. Similarity of the coordinators' responses about the conceptions of Scientific Dissemination:



Similarity bigger or equal to 0.99

(1) – (grupsesp e instpubl): As a conception of Scientific Dissemination, for whom information is intended, Coordinators represent public institutions (State Secretariats, Public Prosecutors, Federal and Municipal Organs) similarly to specific groups (researchers, researched populations and institutions studied).

Similarity bigger or equal to 0.97

(2) – [difusao e (grupoesp e instpubl)]: The conceptions of Scientific Dissemination appear as diffusion associated with specific groups (researchers, researched populations and institutions studied) and public institutions (Secretaries of State, Public Prosecution, Federal and Municipal Organs).

Similarity bigger or equal to 0.91

(3) – (comacad e açoesprog): The conception of Scientific Divulgation appears directed to the academic community (pairs and students) as planned actions - socialization of the scientific society; to contribute to scientific findings becoming agendas with decision-makers; reverse the results of scientific research on concrete actions and the ability to influence health policy, management, and planning.

Similarity bigger or equal to 0.87

(4) – (eventos e comucient): The conception of Scientific Dissemination appears the scientific events (of interest of the peers and interest of the academic society) associated to the scientific communication (periodicals, reports, dissertations and theses, congresses, classes, seminars, and lectures).

Similarity bigger or equal to 0.83

(5) – (metodol e comupop): Scientific Dissemination is conceived as a communication that has as its principle the responsibility and commitment throughout the process of research and dissemination of results and reproduction of researchers - methodology - translating the knowledge aimed at contributing to the reality of health and conditions of population or population groups.

(6) – (tradcompr e gestores): The concept of Scientific Dissemination appears as communication - translation - aimed at the ordinary citizen, managers of other areas of knowledge and local authorities. The translation is reported as understandable (language that makes possible the understanding of the results of scientific knowledge) and conflicting translation (journalists' preparation as well as the challenge of researchers and journalists to deal with conflicting expectations about the information to be shared).

Similarity bigger or equal to 0.78

(7) – (divulga e socampli): The concept of Scientific Dissemination appears as the Scientific Dissemination is conceived as communication (disclosure) directed to the enlarged society - non-academic (scientific) population.

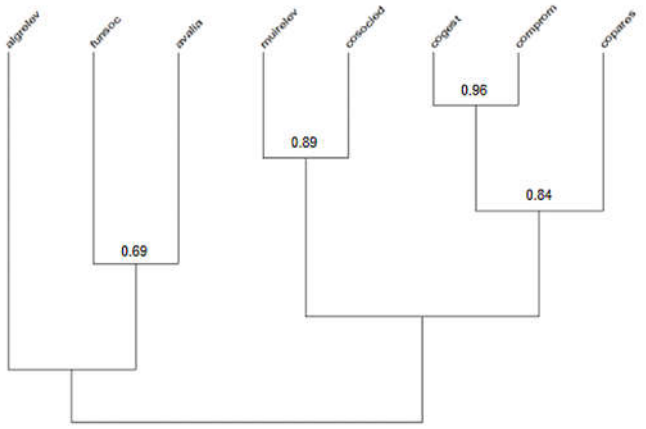
Similarity bigger or equal to 0.71

(8) – {[difusao e (gruposesp e instpubl)] e (eventos comucient)}: The conceptions of Scientific Dissemination appear as events of interest to the peers, being associated to the diffusion directed to the public institutions (Secretaries of States, Public Prosecution, Federal and Municipal Organs) and specific groups (researchers, researched populations and studied institutions). However, it is scientific communication (periodicals, reports, dissertations and theses, congresses, lectures, seminars and workshops) that prevails while focused on the specific groups in which the institutions end up being understood as belonging to these groups.

Similarity bigger or equal to 0.59

(9) – [dissemina e (comacad e açoesprog)]: Scientific Dissemination is conceived as a scientific dissemination that appears aimed at the academic community (peers and students) as planned actions - socialization of the scientific society; to contribute to scientific findings becoming agendas with decision-makers; reverse the results of scientific research on concrete actions and the ability to influence health policy, management and planning.

Figure 2. Similarity of coordinators' responses conceptions of the relevance of Scientific Dissemination to the programs they coordinate.



Similarity bigger or equal to 0.96

(1) – (cogest e comprom): The coordinators' conception of the relevance of scientific dissemination to the program appears as an important link between the program's commitment to regional development and contribution to the local population and scientific community, and communication with funding agencies and potential partners - which establish interfaces with vulnerable programs and communities.

Similarity bigger or equal to 0.89

(2) – (muirelev e cosocied: Scientific Dissemination is of fundamental importance in the conception of the Coordinators by the Program's action with non-scientific society - via communication with society and the community - so that the population has access to information allowing the knowledge and appropriation of the scientific facts evidenced in research.

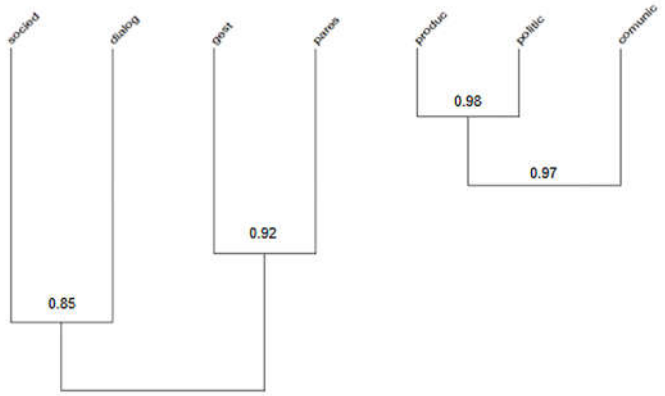
Similarity bigger or equal to 0.84

(3) – [(cogest e comprom) e copares]: The relevance of Scientific Dissemination appears as an important commitment of the Graduate Program in Public Health aimed at communicating with the managers (funding agencies and potential partners), with the non-scientific society and with the peers in which the dissemination of the knowledge produced - network that it feeds and advances new levels and possible solutions for health - can promote reflection and application in the practice of professionals.

Similarity bigger or equal to 0.69

(4) – (funsoc e avalia): In the design of the coordinators, Scientific Dissemination appears as a relevant socialization of the knowledge generated, making public the scientific production, an important evaluation criterion of the Ministry of Education of Brazil - a path of democratization of access to scientific production, returning to society its own investment in the training of researchers.

Figure 3: Similarity of Coordinators' responses conceptions of the importance that scientific dissemination should/could have as a policy for the programs they coordinate



Similarity bigger or equal to 0.98

(1) – (produc e politic): The importance of Scientific Dissemination as a communication policy appears as a systematization and consolidation of the role of graduate programs as elements of knowledge production within the university - broadening the dissemination of the program's and teachers' production - as well as in the partnership between the post and society.

Similarity bigger or equal to 0.97

(2) – [(produc e politic) e comunic]: The importance of scientific dissemination as a communication policy appears as a systematization and consolidation of the role of graduate programs as elements of knowledge production within the university - broadening the dissemination of the program's and teachers' production - as well as in the partnership between the post and the society, being the communication thought as strategies so that the information can arrive in the most correct and accessible way, taking information to the pairs and the possibility of citation in other studies.

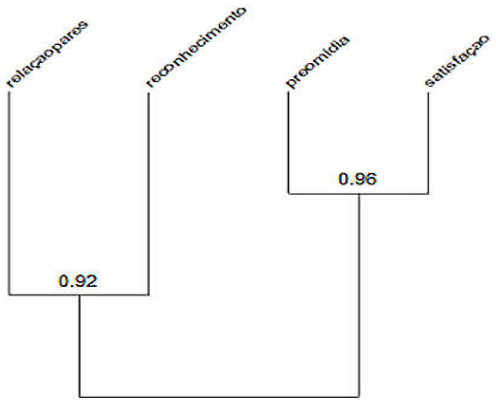
Similarity bigger or equal to 0.92

(3) – (gest e pares): The importance of Scientific Dissemination as a graduate program policy appears for managers - public and local authorities - and for internal and external peers (international community).

Similarity bigger or equal to 0.85

(4) – (socied e dialog): The importance of Scientific Dissemination as a postgraduate program policy appears as a significant dialogue between the program and the community, being understood as the main form of accountability and transparency of knowledge, improving the way of communication with the general public of the different social classes in the search for solutions to problems aiming at transformations or changes of a reality.

Figure 4. Similarity of the responses of PPGSC coordinators about the meaning of participation in scientific dissemination activities/actions



Similarity bigger or equal to 0.96

(1) – (preomidia e satisfaçao): The meaning of the participation in Scientific Dissemination activity appears related to the coordinators for the transfer of how a research is developed, its importance for the population and the recognition of more people. However, the dissemination of research-related activities also appears as a concern for communication vehicles that distort speech and cut important parts of the testimonies that describe research, misinterpretations - TV, magazines - that amplify the exposure but do not change the course of the research activities.

Similarity bigger or equal to 0.92

(2) – (relaçaopares e reconhecimento): The significance of participation in Scientific Dissemination activity is related to the coordinators, such as the establishment of partnerships with peers - managers, institutional partners and the academic community - and the recognition of work as a repercussion with partners, the community served and by a larger number of people. Among pairs, conferences and events there is a direct relationship between quality of work and criticism.

Implication Analysis Results

Figure 5 - Implication of coordinators' responses to the concept of scientific dissemination

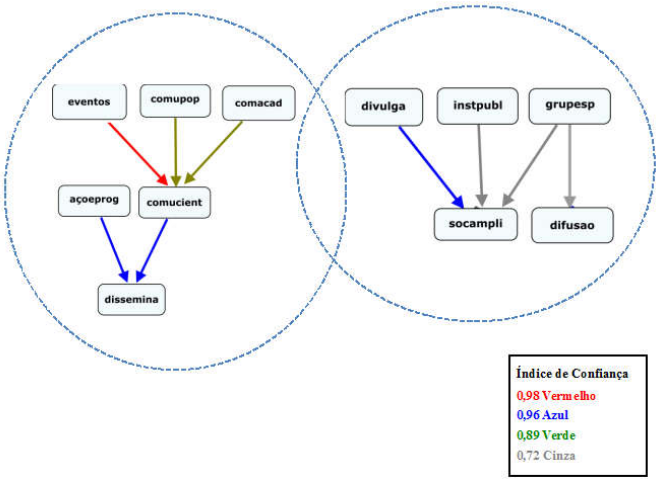


Figure 5 shows the implication vectors that correlate the units of significance according to the confidence index, in which two groups are identified. On the left the unit of signification 'eventos' is strongly implied (0.98) to 'comucient', evidencing that the events reported as of interest of the peers and general interest of the society are significantly aimed at scientific communication. The units of meaning 'comupop' and 'comacad', are implicated (0.89) to the 'comucient', which shows that popular communication, although aimed at contributing to the knowledge of the reality of health and living conditions of populations, is joint with the academic community focused on scientific communication. Still on the left the unit of meaning 'comucient' that appears as the unit that presents the greatest number of relations between meanings in this group, is implied (0.96) with 'dissemina', which evidences a conception of scientific communication as dissemination (communication directed towards peers and academic community). The unit of signification 'açoesprog' is also implicated (0.96) to the 'dissemina', showing that the planned actions aimed at the socialization of the scientific society and to contribute to the scientific findings become agendas with the decision makers, as dissemination, are capable of influencing policy, management, and planning in health. To the right the unit of signification 'divulga' is implied (0.96) the 'socampli', which corresponds to the most appropriate sense of scientific dissemination. This unit, 'socampli', which appears as the unit that presents the greatest number of relations between meanings in this group, is related (0.72) also to 'instpubl' and 'gruposesp' (0.72), showing that when the coordinators speak of scientific dissemination related to public institutions - Secretariats of State, Public Ministry and Federal and Municipal Organs - and to specific groups - researchers, researched populations and institutions studied - also refer to the extended society, 'socampli'. Still to the right the unit of signification, 'gruposesp', which is implicated (0.72) to 'socampli' and 'diffusion' (0.72), gives meaning to the conception of scientific communication of this group in which diffusion is thought as communication) target to groups (specific groups, public institutions and the enlarged society).

DISCUSSION

This study focused on analyzing conceptions of Coordinators of Graduate Programs in Public Health about the Scientific Dissemination that integrates the field of public communication science and technology. The study is associated with the proposal to organize a new field of research on the conception of researchers and scientists about the Scientific Dissemination and broader scope, about the public communication of science and technology. The content analysis of the Coordinators' responses on Scientific Dissemination, supported by the analysis of the data submitted to the CHIC® software, allowed the constitution of six different themes in which the 34 variables representing the meaning units were distributed.

These topics are as follows: 1. Scientific Dissemination understood as communication of results independent of the form of transmission: Diffusion; 2. Scientific Dissemination as an expression of scientific communication between peers and academia: Dissemination; 3. Scientific Dissemination as an expression of communication directed to the enlarged society; 4. Conflicts and interests related to Scientific Dissemination; 5. The rights of the population to scientific information; 6. Scientific Dissemination directed to specific groups.

Themes 1-3: 1 - Scientific Dissemination understood as communication of results independent of the form of transmission: Diffusion. 2. Scientific Dissemination as an expression of scientific communication between peers and academia: Dissemination. 3. Scientific dissemination as an expression of a communication directed to an enlarged society. Although topics one to three reserve characteristics of specificity, they are discussed together by referring to a set of terms that are often used as synonyms. Although the terms are often used as synonyms, Hernándes Cañadas comments that a deeper analysis of each reveals political-ideological values contained therein, pointing, consequently, to different practices (HERNÁNDEZ CAÑADAS, 1987: 25). In this study about the conceptions of Scientific Dissemination, it was verified the indistinct use of these terms by the Coordinators of Graduate Programs in Public Health. What points out that there is still a need to retake the question that points out the differences and specificities of meanings. We refer to Pasquali (1978) and Bueno (1984, 1985, 2002) for due clarification about the peculiarity of each of the terms. Venezuelan Antonio Pasquali was a pioneer in the formation of Latin American thought and study of communication, starting in the 1960s, and a forerunner in the studies of a scientific communication geared towards an enlarged society (CARVALHO and BERTHA, 2000). Bueno defended the first thesis, in Brazil, on the subject of scientific journalism, which is one of the modalities of making Scientific Dissemination became a reference for studies in this area. The definitions that follow are based on Pasquali (1978) and Bueno (1985).

Diffusion

Pasquali (1978) defines diffusion as "the sending of messages elaborated in universally comprehensible codes or languages to all people". Bueno (1985) adds information that in practice "refers to any and all processes or resources used for the dissemination of scientific and technological information" (BUENO, 1985, p.1420). The spread of science encompasses the scientific dissemination. It refers to any form of transmitting science and technology information, whether directed to peers or directed to lay society. It uses any type of vehicle, from unique to peer-to-peer communication to mass media vehicles, most recently including social media.

Dissemination

It refers to the transfer of science and technology information to a specific and restricted public, made up of experts who are reported using a technical language code and formally elaborated within the context of the so-called "Invisible College" (PRICE, 1973) and ZIMAN, 1981). The definition of this term made by Pasquali, for whom it is a communication that can be made intrapair (specialists from the same area) or extra pairs (specialists from different areas). Based on the concept of a scientific field (BOURDIEU, 2004), it can be seen that science increasingly specializes in creating subfields within the same field, with the development of an increasingly restricted communication code. Therefore, it is more acceptable that dissemination specifically addresses to peers in the same scientific field.

Dissemination with sense of popularization

Pasquali (1978) conceptualizes dissemination as transcoded messages. A process that transforms the language, initially restricted to a specific group of specialists, into accessible languages. Different publics use different forms of the same language code, with their own characteristics. A disseminator of science and technology must, therefore, know the audience to whom the message is intended to use the appropriate format of language that will reach that particular audience. For public health professionals, this perception is fundamental to achieving success in intermediation involving specific groups.
Bueno (1985) defines this as a process of recoding and transposing language, from the specialized to the ordinary citizen, aiming at a wide audience. More traditional mass media vehicles such as Radio and TV, and nowadays the internet and social medias, as well as any other form/vehicle of popular communication, are included. However, what draws attention from the conceptual point of view when taking the three definitions is the understanding that the process of information transfer, revealed in the analysis of the conceptions of the Coordinators, is mostly vectorial and not dialogic. However, for Paulo Freire (1977), teaching is meaningless if it is not understood within a teaching-learning process. Therefore, scientific information would need to be rethought within an interactive logic.

Theme 4 - Rights of the population to scientific information.
It is evident, as a result of the analysis of the statements made by the Coordinators that there is an understanding that the Scientific Dissemination is related to the right of access to scientific information by the members of the society. Although this conception is not necessarily linked to the responses of all the Coordinators, it is an important point in this study, revealed in the process of its analysis.

Contemporary studies related to the confluence between Science, Technology, and Society (CTS), synthesize the characteristics that shape the modern Knowledge Society. These studies provide a review and correction of a model that outlined the adoption of policies related to science and technology according to a linear and one-vector pattern. The logic that attributed only the right not only of opinion but mainly of the decision to authorities, particularly the scientific ones. In the context of CTS Studies, as advocated by the Organization of Ibero-American States initiated around the 1970s, science is understood from the perspective of the combination of science and technology, such as:

"... an inherently social process or product where non-epistemic or technical elements (eg, moral values, religious convictions, professional interests, economic pressures, etc.) play a decisive role in the genesis and consolidation of scientific ideas and artifacts technological "(BAZZO *et al*, 2003, p 126).

A challenge is launched from the perspective of UNESCO for researchers and research institutions regarding transference, aiming at the appropriation by the society the scientific knowledge. Explained in Werthein (2003):

Paradoxically, amid the new technologies, teaching science becomes a challenging process for educators. How then to interest children, adolescents, young people and adults in a fascinating world, yet still hidden behind a bark of erudition and strangeness, as if it were not related to the present day and the moment of now? (WERTHEIM in Scientific Culture: a right of all, 2003, p.8). In a similar line of interest in science education, the Organization of Ibero-American States for Science and Culture (OEI) has been promoting studies about CTS for about 30 years, a field of study that discusses the democratic regulation of science and technology, and aims, among other things, to promote scientific literacy as an integral part of general culture, while also seeking to reduce social distances for access to scientific-technological culture. It is also included in the context of the social sharing of scientific information the recognition that in the scope of rights, access to information is a positive right, included in the list of fourth-generation rights considered fundamental in democratic societies (Hins and Vororohoff, 2007), (VIEGAS, 2003-2004). What is not yet elaborated, and what is proposed here, concerns the inclusion in the role of human rights, the right to scientific knowledge. The university, as a research institution, which acts in the generation of scientific knowledge and information, should be attentive to these questions in general, and particularly to the issue of the right of access to scientific information.

Theme 5 - Conflicts and interests related to Scientific Dissemination.

It is evident, through the analysis of the Coordinators' statements, that there is difficulty in transposing scientific knowledge, in the form of information from the research team to the society, because of the intermediary of this action. This is noticeable in the narrative of some of the Coordinators, specifically those who are involved in Scientific Dissemination actions/activities, because not all have an articulation with

Scientific Dissemination. Although this observation has been made by few Coordinators, the weight it represents in public science communication is significant enough to constitute a theme. As this difficulty is not exclusive to the field of public health but has correspondence in the universe of different fields of science and technology, deserves a deepening.

The conflict between researchers and journalists is a phenomenon that was studied some years ago by Chappell and Hartz (1977). These researchers developed a research carried out in the United States on the relations between journalists and scientists. The results of the study, based on the study of 1,400 scientists and journalists, were published in the Worlds Apart document, published at the end of 1997 and became a reference in the field. The document produced is intended to be useful to both journalists working with the dissemination of science as an incentive to entrepreneurship in the field and to scientists who want the public to develop a deeper understanding of their work. The study of Chappell and Hartz (1997) is based on the certainty of the great influence that science exerts on daily life and from previous studies which show that most Americans are very curious about science, although they can not understand much of what they read and they hear about science. With the launching of the Sputnik satellite by the Soviet Union in 1957, together with the American race to overcome the disadvantage and search for scientific hegemony, a great social interest for science was motivated by motivating journalists to write on the subject. This social commotion, however, stumbled in the difficulty that scientists had in communicating with the public by virtue of the cold war years in which science was treated as a secret and subsequently with the collapse of the Soviet empire with a consequent cooling of interest in the propagation of scientific news. In order to reduce the distance between scientists and journalists, the authors of the research conclude that: Scientists and journalists should seek the path of dialogue. Scientists should receive training from journalists and journalists should receive training from scientists. The scientific community must train communicators to speak to different scientific disciplines. Journalists should increase their understanding and training in science. Publishers of scientific articles should require authors to include summaries of their results written in plain language. Journalists should use peer-reviewed scientific articles to guide their scientific dissemination texts. All scientific disciplines must use the resources of the Internet and develop pages of communication, which also be done by the communication vehicles.

Theme 6 - Meaning of involvement in scientific dissemination activities/actions.

This is a subject for which there seems to be no literature to support a discussion based on comparative studies. No studies dealing with this theme or similar theme were found. As previously stated there are studies that deal with public perceptions, but studies dealing with the conceptions of scientists and researchers have not been localized. What supports this discussion are the very answers that the Coordinators gave to the question related to what meaning would have for the personal life the involvement in actions or activities of Scientific Dissemination, therefore exceptionally some data that would have to appear in the section results are presented here. Seventeen of the twenty Coordinators answered affirmatively that they participated in Scientific Dissemination actions/activities from 2008 to 2010.

There was no significant difference in the responses of the Coordinators who participated in Scientific Dissemination actions/activities with respect to the question whether the demand for this involvement was personal (13 replies) or external (10 replies) - and there could be concomitance of personal/external demand. The means of Scientific Dissemination used were as follows - the number of Coordinators follows in parentheses: Journal (13), Lecture (12), Magazine (9), TV (8), Radio (6) and Internet (6). The 17 responses of the PPGSC Coordinators were transformed into four Context Units, which consequently generated four Registration Units, four Units of Significance, finally represented by four Variables. In the elaboration of the great Thematics, when working with the vision of the whole, the Thematic was organized about the significance of the involvement of the PPGSC Coordinators in Scientific Dissemination activities/actions with the subsidy of the "muirlev" and "algrelev" Variables, excluding the variables "relaocopares" and "preomidia" that came to incorporate Themes two and five, respectively. Even the Coordinator, who although engaging in Scientific Dissemination actions/activities and replied that this had "no special significance," his response, however, reveals that there was recognition "especially by students." This recognition, in the Coordinator's response, appears as "greater visibility".
The level of significance varies from some relevance to a lot of relevance and involves the feelings of satisfaction and recognition.

Conclusion

This research revealed that the University's urgent mission, understood as dialogue with society, from the perspective of Coordinators of Graduate Programs in Public Health is not fully met. However, there was a movement towards achieving this objective, revealed by the analysis of the conceptions that Coordinators have of Scientific Dissemination. There is no consensus about what is Scientific Dissemination by the Coordinators studied. Some see it as the diffusion of knowledge, without distinguishing the differences between the scientific community and the enlarged society. Others conceive it as Dissemination of knowledge, aimed at the scientific community. However, it is also understood in its full sense of being a communication directed to the enlarged society. Within this group, a smaller number of Coordinators have the exact notion of the need for language adaptation, at the same time representing a commitment and challenge on the part of the teacher as a researcher. Majority of the conception of Dissemination with the sense of popularization as Scientific Dissemination of knowledge to peers is that which passes through the answers issued by the Coordinators participating in the research. In view of this, it was verified that the actions related to scientific communication and the transmission of scientific knowledge are mainly directed to the scientific community and are the activities where the Coordinators concentrate more time and resources. The concept of Scientific Dissemination as a communication directed to the enlarged society, representing at the same time a commitment of the Graduate Program and the teacher-researcher, is present in the report of some of the Coordinators. Although some Coordinators understand Scientific Dissemination as a communication aimed at an enlarged society, not everyone has the understanding that this in addition to representing a commitment to fulfill the social role of the university, represents at the same time a challenge to the teacher-

researcher by the fact of the need to transmit the information in language of access to the population because it means a response to a citizen's right. The conception of Scientific Dissemination as a challenge for the researcher is understandable by the fact that in order to constitute and maintain himself as a researcher in the competitive scientific "market", a domain of everything that involves a scientific career is required. Being that communication with the scientific community through scientific publication requires a great effort by many researchers. At this moment getting involved with the scientific dissemination still represents an extemporaneous activity.

Even though it is recognized as relevant, the practice of Scientific Dissemination is developed with conflicts, particularly when the presence of an intermediary is present, in this case, journalists. The Coordinators' responses reveal that the researcher persists in the difficulty of depending on an intermediary to make scientific dissemination. In this sense, it is understood as a solution to this impasse, the Graduate Program itself establishes a communication policy that privileges the Scientific Dissemination directed to the enlarged society. One does not learn, at the undergraduate or graduate level, to make Scientific Dissemination directed to the enlarged society. Although the field of public health is the society, the academic career in this area of knowledge is tied to the requirements of scientific production strict sense, determined by the area of specialization in which the teacher-researcher concentrates. The association of Scientific Dissemination as citizenship responsibility or as part of the career of the teacher-researcher has extremely small representativeness in the reports of the Coordinators. The fact that it becomes an evaluation item for both the teacher-researcher and the program and is part of the calls for funding, has also led in an incipient way, a reflection on the issue of Scientific Dissemination as an important part of the Graduate Programs. This reflection points to the perspective of a public communication of science as a human rights issue and not just as a university extension activity.

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