From scientific dissemination to public communication: actions of communication of science in the University

De la difusión científica a la comunicación pública: acciones de comunicación de la ciencia en la universidad

Da divulgação científica à comunicação pública: ações de comunicação da ciência na universidade

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Abstract: This paper presents research results regarding the communication of science at the Federal University of Uberlândia (UFU) from a bibliographic review on the Public Communication of Science (CPC) and related areas, such as technoscience. Part of the assumption that the Public Communication of Science encompasses scientific dissemination, but transcends this process aiming the engagement, empowerment and the autonomy of the subject, which is inevitably linked to science. It also updates a CPC diagnosis in the UFU and adopts as methodology, in addition to the documentary research, interviews with UFU 2016-2020 management members. When updating the communication scenario of the institution, it concludes that the university is in a new moment since the beginning of the current high administration term, with highly positive actions in science communication, but still far from public communication.

Keywords:
Public Communication of Science. Scientific divulgation. Engagement

Resumen: Este artículo presenta resultados de investigación sobre la comunicación de la ciencia en la Universidad Federal de Uberlândia (UFU) a partir de una revisión bibliográfica sobre la Comunicación Pública de la Ciencia (CPC) y áreas relacionadas, como la tecnociencia. Parte de la suposición de que la Comunicación Pública de la Ciencia abarca la difusión científica, pero trasciende este proceso con el objetivo de la participación, el empoderamiento y la autonomía del tema, que está inevitablemente vinculado a la ciencia. También actualiza un diagnóstico de CPC en la UFU y adopta como metodología, además de la investigación documental, entrevistas con miembros de la gerencia de UFU 2016-2020. Al actualizar el escenario de comunicación de la institución, concluye que la universidad se encuentra en un nuevo momento desde el comienzo del período actual de alta administración, con acciones altamente positivas en la comunicación científica, pero aún lejos de la comunicación pública.

Palabras clave:
Comunicación pública de la ciencia. Divulgación científica. Compromiso

Resumo: Este artigo apresenta resultados de pesquisas sobre comunicação científica na Universidade Federal de Uberlândia (UFU) a partir de uma revisão bibliográfica sobre Comunicação Pública da Ciência (CPC) e áreas afins, como a tecnociência. Parte do pressuposto de que a Comunicação Pública da Ciência engloba a divulgação científica, mas transcende esse processo com o objetivo de participação, empoderamento e autonomia do sujeito, inevitavelmente ligado à ciência. Também atualiza o diagnóstico de CPC na UFU e adota, além da pesquisa documental, entrevistas com membros da gerência da UFU 2016-2020. Ao atualizar o cenário de comunicação da instituição, ele conclui que a universidade está em um novo momento desde o início do atual período de alta administração, com ações altamente positivas na comunicação científica, mas ainda distante da comunicação pública.

Palavras-chave:
Comunicação pública da ciência. Divulgação científica. Compromisso

1. From Technoscience to Public Communication of Science

1.1 Technoscience and scientific communication

First of all, it is important to understand that the new information and communication technologies constantly modify the scenario in which we live and the discussions about science must also consider that fluidity, ephemerality and complexity as inherent aspects of these relations. It is ideal to depart from simplistic debates and of those that apply limiting concepts. With technoscience, it could not be different.

The technoscience is discussed by Castelfranchi (2008), presenting here only a concise definition. For the author, the concept that refers only to the division between science and technology is valid but reduces the wide range of potentialities.

Technoscience is "the interweaving between the devices of production of scientific knowledge, techniques and capitalism within the rationality of the current government" (Castelfranchi, 2008, p. 9). The author reinforces that science is not synonymous with technology, but can originate partially from the techniques (Castelfranchi, 2008). Reminding that "the idea that science belongs to all and for all makes knowledge not be seen as an exchange between natural philosophers and even less so as among specialists in universities" (Castelfranchi, 2008, p. 196).

Starting from this definition of technoscience, it is worth remembering that scientific communication, whose longing must surpass the level of scientists for the non-research society, is a constituent part of technoscience. Therefore, it must answer questions about the meaning of knowledge if not shared? The knowledge coming from science, here understood as "composed of a set of systematic practices of research and investigation that aims to create knowledge about reality" (Cardoso e Jaccobetty, 2009, p. 11), also needs to be communicated.

It is important to highlight Ziman's opinion on the subject (1987, p. 80 apud Castelfranchi, 2008, p. 192) according to which

> the basic principle of academic science is that the results of the research must be public. Whatever scientists think or say as individuals, their findings can not be considered as belonging to scientific knowledge unless they are reported and recorded permanently. The fundamental institution of science is, in this case, the system of communication.

The author adds that "communication is important, in today's technoscience as well as in modern science, also to substantiate the legitimation and validation of ideas" (Castelfranchi, 2008, p. 195). The communication should inform the impacts of science, both positive and

negative, in the economic, social, and political spheres. It is possible, then, to think that technoscience, through scientific and technological institutions, is legitimated by communication.

According to Silva, Pinheiro and Reinheimer (2013):

> scientific development depends on what is published. The established knowledge is added, improved, or modified, as Mueller (1995) reminds us, "by the results of new research". The production of scientific knowledge is made possible by the dissemination, which according to this author is an "act inherent to scientific research". (p. 146)

Castelfranchi (2008) reiterates that, in this context, it is necessary to depart from mediocre arguments. For the author,

> the communication of science is not a linear and unidirectional chain (science-mediators-public), but a network of two-way osmotic flows, not always containing scientific institutions or scientists as fundamental actors or as point of origin.
> (Castelfranchi, 2008, p. 13)

The author lists a series of authors who present justifications for publicly communicating science. One of them is Moser, who emphasizes that in addition to personal satisfaction there is "public education: it is important to convey a rational attitude towards the problems and the value of the scientific way of thinking" (Moser et al., 2007 apud Castelfranchi, 2008, p. 288). Such line of thought helps in the reflection about the public communication of science.

2. From public communication to Public Communication of Science

Before entering the discussions on Public Communication (PC), it is important to highlight Haswani's (2013) thoughts, according to which:

> The term public is always mentioned, in its various aspects, accompanied by other words that amplify and fragment its meaning: public health, public highway, preferential public, public agency, among others. It is also necessary to consider some frequently used expressions with different meanings, often even at random: public interest, public space, public sphere, public opinion, among others. And these expressions - which this chapter deals with - constitute an important role, the root of public communication. (p. 10).

Liedtke and Curtinovi (2016), when studying the concept of PC and its use in Brazil, affirm that Public Communication can be considered as an evolution of several other concepts that preceded it and encompass a greater conjuncture. The PC can be understood as "organizational, business, governmental, political, integrated, corporate, administrative and strategic communication" (p. 2).

In the second half of the 1990s, when Heloiza Matos brought to Brazil the studies of Zemor (2005) on the subject, the definition of PC begins to gain more specific contours. Zémor

one of the main references in the studies on public communication, does not restrict the concept to public institutions, but warns that the purposes of the PC should not be disconnected from the functions of public institutions, functions such as informing , listening to the public, contributing to social relations and observe behavioral changes and changes in society's organization (Matos, 2011).

For Koçouski (2012), in turn, the PC happens in fact when the gaze is directed to the public interest, "from the responsibility that the agent has (or assumes) to recognize and to attend the right of the citizens to the information and participation in subjects relevant to the human condition or life in society " (p. 92). According to the author, the purpose of public communication is to "promote citizenship and mobilize the debate on issues affecting the community, seeking to achieve, in more advanced stages, negotiations and consensus".

He shares Jorge Duarte's point of view by saying that in PC it is necessary that the heart of it be the citizen; "Not only by guaranteeing the right to information and expression, but also by dialogue, by respecting their characteristics and needs, by encouraging active, rational and co-responsible participation" (Duarte, 2009, p. 61).

According to Lopez (2011) public communication is totally linked to the definition of democracy and, thus, prioritizes community and active participation.

> The communication is public when two conditions are met: 1) that it results from collective subjects, even if they are represented or expressed through individuals; 2) that it refers to the construction of what is public. Therefore, it is an inclusive and participatory communication, whose vocation could not be at the service of the manipulation of wills or the elimination of individuality, characteristics of fascist communication. It is an eminently democratic communication, because of the depth of its nature and its vocation.
> (López, 2011, p. 65).

It is understood that the guiding principle of public communication is the pursuit of transparency and the construction of citizenship. And in this sense, it serves the interests of science and, thus, enables the Public Communication of Science.

It should be emphasized that the Public Communication of Science encompasses different concepts such as scientific journalism, scientific dissemination, science communication, besides being investigated under different aspects and models depending on the author consulted.

> Since the needs served by the public communication of science and technology or public understanding of science or the social appropriation of science and technology - whatever the name many may be - are so complex, this means that public communication is inherently a political process.
> (Lewenstein, 2010, p. 17, our translation)

Castelfranchi (2008) also analyzes the Public Communication of Science, but from the interests of the bourgeoisie when he states that

> many aimed at public communication of science as an instrument for achieving political objectives. For a part of the bourgeoisie, the Enlightenment conception of science as an instrument of liberation from the yoke of oppression and superstition made dissemination one of the instruments for the modernization of national states. (p. 203)

It is worth noting that, like PC, the concept of PCS, whose political bias is inherent, is part of the trajectory of its construction and development, meaning this relationship cannot be understood as erroneous, while at the same time it is wrong to summarize Public Communication, especially that of science, as essentially governmental.

Lewenstein (2010) in addressing the theme perceives the communication of science as an instrument that should serve society in several areas. For the author,

> Those of us who believe in democracy deeply believe that the more people understand issues such as global climate change, genetically modified food, pharmaceuticals prices, environmental implications of fishery and agricultural and forestry policies, economic needs and national security - all of these issues will be better treated by citizen-elected representatives who can express informed opinions about how they would like their governments and community organizations to understand these commitments that are needed in the real world to deal with these complex issues. (p. 16)

Still on the concept of PCS, Daza-Caicedo (2013) considers it as synonymous with the concept of Social Appropriation of Science and Technology (ASCyT), which is used for three purposes:

> [...] a) as ways of naming activities such as those held in museums, fairs and scientific weeks, scientific communication in mass media, non-formal and informal educational activities in science and technology, among others. b) As a concept of academic research that deals with the different ways in which science and society are related. Much of this research focuses on analyzing the relationships that occur between specialists and non-specialists; these papers may be located in different theoretical positions. c) In the field of science and technology policies, with programs that seek to encourage the development of activities, research, and evaluation of these issues.
> (Daza-Caicedo, 2013, p. 51, our translation).

The author reinforces the fact that the concept is characterized as a frontier object, because "[...] there is no definition in the field accepted by all, but each actor who uses it makes sense and constructs its meaning according to their interests , without imposing its interpretation on others." (Daza-Caicedo, 2013, p. 54, our translation). It points out that, around this and other terminologies, as Public Understanding of Science (PUS) are involved several actors: scientific journalists, social activists, among others, and infrastructures such as museums, fairs, congresses, etc. (Daza-Caicedo, 2013, p. 55, our translation).

PCS is also discussed within specific models. "The difference between the models is given by the way science is understood (as a finished product or as a social activity); by the relation of science to other social actors and by what is expected to be achieved from these relations." (Daza-Caicedo, 2013, p. 52, our translation).

For Lewenstein (2010), there are four PCS models, namely: the deficit, the contextual (both within the larger model that he calls the transmission or unidirectional tendency), knowledge and scientific engagement (inserted in the second model, called engagement). Summarizing the four models, he states that

> The deficit model and contextual model focus on delivering information to people. Lay knowledge and public engagement are sometimes called dialogic or interactive models - they focus more on the interaction between different audiences and the scientific community that is trying to provide information
> (Lewenstein, 2010, p. 180, our translation).

When it comes to the deficit model, it emerges from the scientific community, which is concerned with providing information about science to society that has a deficit in knowledge about science and technology. Some of the materials the author considers brilliant, though critical to this model, are Stephen Hawking's "Brief History of Time", with more than 12 million copies sold worldwide, as well as excellent information provided by aquariums and planetaries (Lewenstein, 2010, pp. 18-19).

Still on the deficit model, the author emphasizes researches of scientific knowledge that are applied to the population, but that have little effect on the knowledge change of the people, besides classifying them hierarchically or in labels, as "attentive public" referring those informed about science and technology; and interested public (not informed but pay attention), for example.

As far as the contextual model is concerned, an aspect that is precisely the context in which science and technology (S & T) communication is found. For the author, the social scene is fundamental, for example:

> If I take my son to the science museum, he remembers anything about how to achieve a balance between displacement and buoyancy in a large bucket of water? No, of course not. He remembers spending a day with his parents, having fun. But if I take my students to the museum of science, what do they think? They want to know what they have to know to pass the test! So, the context makes a big difference.
> (Lewenstein, 2010, pp. 21-22, our translation)

The author complements that the contextual model focuses on delivering information to different publics, but still does not care about understanding what would be behind the different information needs.

One arrives at the local or "lay" model of knowledge, which presents characteristics that are closer to a public participation of the researchers. This is because this model values the local knowledge of a particular public, region and/or economic/social context and counts on the help of non-scientists to develop studies.

However, the local knowledge model also has difficulties since not all local knowledge is correct and, in addition, it is difficult to develop actions, since knowledge of that locality is not known until it is brought to discussion (Lewenstein, 2010, P. 26). For the author

> The idea of the value of local knowledge is not just about the possibility of distrust of knowledge coming from distant experts. Nor is it simply that local non-scientists misunderstand the information that scientists provide. Instead, the idea of lay knowledge emphasizes that local communities have collective knowledge that they have developed over many years and on which they trust. This knowledge is actively built by the community, as it brings information from many sources to solve their problems.
> (Lewenstein, 2010, p. 24, our translation)

Finally, the author highlights the model of public engagement, which many people appropriate without knowing the real definition or the profound political implications. A synthesis of the model explains that

> The real activities of public engagement are not only to listen to the local knowledge and to obtain the opinions of the communities. It is about the transfer of political power and authority. Is this something that scientists, government agencies or industrial leaders are willing to do? People sometimes ask for a revolution in social power. However, revolutions are violent and dangerous things. Yes, the world is sometimes a better place after the revolution. But in the revolution, some people win and some lose. Sometimes they lose a lot, losing not only power, but wealth and assets and even life. So, I do not expect the transfer of political power that is presented by a true understanding of the public engagement model to happen easily.
> (Lewenstein, 2010, pp. 27-28, our translation)

The author reinforces that, despite the difficulties of establishing the model of public engagement, it is possible to develop actions to show citizens how they can obtain the knowledge they need and actively participate in the processes in the context of science and technology.

All models have its pros and cons, but if we want to think about democracy, it is not a question of prioritizing one or the other; one must necessarily think of a combination of the four models (Lewenstein, 2010). These models therefore focus on participatory dialogue among those involved in the communication of science. In fact, the Public Communication of Science, whose

character differs from the Enlightenment notion of transmitting knowledge unilaterally, has the function and purpose of empowering people, who together build knowledge (Duarte, 2018).

Public Communication of Science can be applied in different contexts, such as. "Activities such as consensus conferences and discussion forums present themselves as conducive spaces for dialogue between the community, scientists and policymakers to take place" (Fares, Navas e Marandino, 2007), although Lewenstein (2010) considers it a challenge to implement such actions in countries as heterogeneous as Brazil.

3. Public communication of science at the Federal University of Uberlândia (Brazil)

In order to deepen the theme, a bibliographical review was developed on the subjects that underpin the study, and archives of the last five years were researched, considering the term itself, its development and the constant political, economic, social and cultural changes through which society, which requires the collection of recent studies on the area.

During the research, one of the authors was linked to the strategic sector of the Directorate of Communication (Dirco) a foundation to support the Federal University of Uberlândia, together with the Radio Foundation and Educational Television of Uberlandia (RTU), holding positions as executive editor, reporter and host. It is Worth emphasizing that the RTU Works in partnership with Dirco; which required, from the methodological point of view, the use of participant observation.

The research is about continuity with another preliminary diagnosis obtained in the year 2015, which pointed out faults in the university's PC. It is noteworthy that the field research conducted by Anjos (2015) was composed of interviews with representatives of 2012-2016 management. For the present study, this diagnosis was updated through interviews with representatives of the new management of UFU (2017-2021) and with the president of the Foundation for Research Support of the State of Minas Gerais (Fapemig). Evaldo Vilela, and with the Director of the Scientific Divulgation Board of the Federal University of Minas Gerais (UFMG), Yurij Castelfranchi, with the proposal to understand how other universities and foundations think and work at PCS.

It is assumed that it is the duty of HEIs to return to society the investments in the form of their duty which encompasses intellectual production; in this way scientists must elucidate to the

public inside and outside the walls of the universities the scientific productions carried out and the various forms of contribution of them, using as a mean to that the PCS.

In addition, it is important to understand PCS as an initiative of public policy and public communication of institutions and governments. Only after such an understanding of the concept was it possible to discuss the PCS in teaching and research institutions, especially at the Federal University of Uberlândia.

What is questioned is whether the scientific productions of the institutions, especially the UFU, go beyond the walls of universities, mainly through the media in general, including digital media or public radio broadcasting. In addition, communication in HEIs should be in line with the Public Communication assumptions and still need to consider actions that aim primarily at the subject's engagement and empowerment.

It is understood that one of the functions of universities is the universalization of knowledge (in view of the limitations of this word) in a way that is in partnership with the market and other public and private institutions and that such relations must be included in the communication planning of the institution itself. Previous research developed in the UFU already warned about the fragilities of the scientific communication hitherto carried out in the scope of the university. For Carneiro (2004) there was no communication policy within the university's own communication sphere. The author warned that

> When one speaks of a university in terms of the desirable, of the ideal, a reference is made to a structure capable of being linked to society. Teaching, research and extension are the keywords that move a university. To do so, it is necessary that all development of these activities be accompanied and understood by public opinion, especially in what concerns its scientific and technological production.
> (Carneiro, 2004, p. 32)

In addition to Carneiro (2004), other research was dedicated to the communication of science in UFU, such as Anjos (2015), the starting point of the research presented here.

4. The scenario of UFU's PCS in 2014: some notes

The present research was based on data collected by Anjos (2015), who perceived noises and barriers in the process of popularization of science and questioned whether in fact the PC existed in the institution. In an interview with the university's upper management, it was possible to first verify that there was, in an explicit way, nothing related to public policies for scientific dissemination / innovation; since according to the author of the research "the goals set forth in

resolution 08/2014 only seek to improve the internal and external communication of UFU" (Anjos, 2015, pp. 83-84).

It adds up the fact that there was not until that moment, as the study points out, a communication plan made available, that is, apparently the related actions were not carried out in a planned and strategic way. According to the work "the dean replied that a specific communication plan does not exist. If there is anything related to the communication plan, it is within the management plan of the rectory, the resolutions " (Angels, 2015, p. 88).

The same research informs that according to former UFU Communications Director, Maria Clara Tomaz Machado, "unfortunately what is seen is that the UFU itself and its managers still do not know what communication is and the importance of social communication for the development of flows " (Anjos, 2015, p. 93).

Another fault pointed out in the preliminary diagnosis of PC at UFU was related to the delicate relationship between journalists and scientists. The author claims that "What is perceived, according to the director, is that researchers are often afraid of journalists spreading their research, distorted, or of using their research to hinder their work." (Anjos, 2015, p. 96).

Also, according to the study, Dirco and RTU did not have a specific framework or specific policy that aimed to disseminate the science of UFU through PC. The then director of Dirco emphasizes that the board had plans to implement assistance actions, such as "the catalog of sources of teachers being created, so that when each professor researches it will be cataloged, to make it easier to identify the best possible corresponding professor of each area of expertise" (Anjos, 2015, pp. 99-100).

Anjos affirms that the communication made had close relation with the assessory of the university. The study pointed out that

> Taking into account the authors, it is perceived that apparently the current management of the UFU is distant from the implementation of public communication policies related to the public communication of science, since in the government program or program letter, as it was published, of the candidate for dean for the Federal University of Uberlândia which came to be elected, there were no proposals for this purpose, since the proposals related to the communication were related to the maintenance and basic operation of the Communication Directorate, with a communication more oriented to an advisory than a communication of two ways, between institution and its public.
> (Angels, 2015, pp. 101-102)

The author concludes that the university signaled, until the closing of the research cited, introductory actions of communication for scientific dissemination. However, it is noteworthy

that the scenario of PC in UFU, as of the inauguration of the new management of UFU in 2017, underwent significant changes and it is possible to identify, in fact, the creation of actions, which, according to the authors surveyed in the theoretical basis, seem to be closer to the intentions of the Public Communication of Science.

5. 2017-2021 Management: from the dissemination to the Public Communication of Science

According to the diagnosis presented, it was necessary to update the information collected by Anjos (2015), since UFU was under new management in 2018. The updating of the diagnosis was carried out through semi-open journalistic interviews, in which "each question is deepened from the respondent's response", whose objective was to obtain "elements for the understanding of a situation or structure of a problem" (Duarte & Barros, 2017, p. 63). The interviews were based on a script with few questions, but "broad enough to be discussed in depth without any interference between them or redundancies" (Duarte & Barros, 2017, pp. 66-67).

The first interview was held with the current dean of the UFU, Valder Steffen Júnior, which stated that on June 26, 2018, an ordinance was approved that approved the General Directives of Institutional Communication of the Social Communication Board that were constantly altered by Dirco during the development of the research. The dean explained that document already existed and was updated by Dirco and organized in the form of an ordinance.

During the interview, the dean stressed that these were guidelines for communication and that they needed to be periodically reviewed. On the same day, the statute was signed, a new Dirco space was inaugurated at the rectory of UFU (Borges, 2018). According to the dean, the Dirco room would also be responsible for all communication actions, including scientific. In the space would establish the Division of Scientific Divulgação, that would count, in principle, with a journalist and a trainee of journalism. The rector emphasizes that, even with the room in the rectory, the academic community should continue to indicate guidelines and make requests for disclosure through the UFU website[i].

The rector of UFU, who is also a member of the Brazilian Academy of Sciences, when asked about the importance of science and its communication, states that "without science there is no university" that, regardless of the area, it is the foundation of all knowledge. For him "science is the basis of what the university fulfills in its duty to educate, to train people". He also

stressed the importance of science for technological development and innovation and that if we do not value science, the university loses the "working material".

Dirco, in the current management, under the direction of the journalist Renata Neiva, developed and continues to develop a series of actions that modified the scenario hitherto pointed out by the aforementioned research. In an interview with the current director of Dirco, Renata Neiva, it was possible to notice a change of level regarding the Communication of Science carried out by UFU. The board has developed actions and projects that prioritize not only the dissemination, but the popularization of science, as the director said during the interview.

The director emphasizes that there has always been a concern to spread the science, however the questioning, by the Dirco team (in 2018) about the communication that has been made so far is directed to the general public or only to the peers, based on reflections, studies and participation in events in the area of science, as well as the creation of the Division of Scientific Divulgation, announced during the first edition of the "Communicate Science"[ii]. This is another important initiative in the context of scientific dissemination and has among its objectives:

> [...] produce and publish journalistic content about research in institutional means of communication; send suggestions of scientific guidelines to the press; to promote discussion events on public communication of science; hold science shows and fairs; organize events of popularization of science in non-academic spaces, such as squares, parks and bars; planning scientific dissemination in university museums; conduct specific media training for researchers; and publicize the catalog of researchers ("Somos UFU" or similar) to the press.
> (Neiva, 2018, p. 1)

Diélen Borges[iii], scientific editor of the Division of Scientific Divulgation, emphasizes that the sector has two fronts: the first is to continue the work of scientific journalism, but in a structured way, that is, with professionals designated exclusively for scientific dissemination actions. The other sector is responsible for "scientific dissemination beyond scientific journalism, that is, promotion of events, exhibitions, science fairs [...]" (verbal information[iv]).

With regard to the events promoted by the Division, the publisher of Science highlights three, held in 2018. The Ask the Scientist[v], in partnership with USP, followed the activities of Yellow September, a month of awareness about suicide prevention, and was held in September 2018 in Sabiá Park, a place for practicing leisure and health activities located in Uberlândia - MG. UFU researchers from the areas of neuroscience, psychiatry and psychology were invited to respond to the population's questions about depression, suicide, prevention and other topics related to mental health (Borges,Tedeschi & Spolaor, 2018).

The sector also promoted, in October 2018, "Science on the street", on the UFU campus in Patos de Minas, also held in a city park and in the form of a "show" of papers by university researchers (Borges, Tedeschi & Spolaor, 2018). And, in April 2018, the “Communicate Science” (at the time the Division of Scientific Dissemination was in the process of being created), an event promoted by Dirco in partnership with Fapemig and PROPP of UFU, which brought together state researchers, students and the press. Dirco also created UFU profile in Instagram, another channel that has also functioned as a means of spreading the science produced in the university.

After updating the diagnosis of PC in UFU, and the brief presentation of the communication actions of science currently developed within the university, it is necessary to emphasize once again that the current management of UFU has carried out activities of Public Communication, very positive and that, therefore, the proposal of the paper is constituted in punctual adjustments in the current process, as a contribution so that the institution can effectively carry out PCS actions per se.

It is important to point out that this research has already presented results during its development, since the contact of the Research and Post-Graduation Dean of UFU with this paper may have contributed to the change of the science communication scenario in UFU, once that soon after the qualification of the research was presented, was created by the University the Division of Scientific Divulgation, a support that is characterized exactly like the initial proposal of this paper, which suggested the emergency necessity of the creation of a nucleus of divulgation of science in the institution.

6. In addition to the dissemination: proposals for public communication of science in the university

6.1 PCS at UFU: what else can be done?

From the beginning of the current management (2016-2020), the process of communication of science in the UFU went through and continues to undergo changes. It is therefore appropriate to give credits to the current management of the Federal University of Uberlândia and to the Communications Department for the implementation of different communication actions of science; the most important being the creation of the Division of Scientific Divulgation and, within the sector, the promotion of activities such as events held

outside the walls of the institution. The university develops actions that go beyond divulgation and it is in this sense that suggestions will be proposed for PCS improvements for the institution. It was tried to show how the documentation and process are currently and how both should be established, according to the studies that supports this article and with the participant observation of the author of the research.

6.2 About the proposal of Social Communication Guidelines (Dirco UFU)

It is proposed to include some topics in the document, since it constitutes the guiding base of the activities of the Communication Directorate, which represents the communication of the UFU as a whole.

Firstly, the Guidelines proposal presents the principles, objectives and actions of UFU's institutional communication. By emphasizing that communication is movement and that there are many possibilities for interaction, reinvention, partnerships (UFU, 2018, p. 2), is close to the speech of the president of Fapemig, which reinforces the dynamism inherent in communicational processes, and this finding is fundamental for the planning of activities.

In pointing out, in the general objective of creating and maintaining information flows, the document also refers to the considerations of Castelfranchi (2008), according to which "the communication of science is not a linear and unidirectional chain (science-mediators-public), but a network of flows ". The document initially meets some introductory precepts of Public Communication according to Zemor (2005), which believes that the functions of public institutions should be configured to listen to the public and follow social changes.

It is noted that use of the term "public" in the Guidelines apparently relates to the fact that the Federal University of Uberlândia is a public agency. It should be emphasized, as was pointed out earlier, that “public communication” is also associated with other concepts, as highlighted by Haswani (2013, p. 10), such as public interest and public opinion; which reinforce the need for communication to be of service to the public, even though it is intended only to reinforce the institution's brand.

It is proposed to reinforce the role of public communication and to have as main bias the interest of the public and, in addition, the viabilization of the formation of citizens engaged, participating and exercising their citizenship, which also includes participating in the communicational process of the university. It is emphasized that it is described that the UFU

communication intends to consolidate the relationship of the institution with the external public and to strengthen interaction with society, but this description does not specifically present the science communication bias. The document informs that:

> As a public institution, the UFU should prioritize its interaction with the society in which it is inserted, creating communication spaces to interface with the different social segments. Its political, technical-scientific and communication actions must also reach the lay public, awakening vocations and interests in relation to the activities developed by UFU. This is also a provision of services and extension to the community, a form of social inclusion and defense of sustainability.
> (UFU, 2018, p. x)

It is added that the interaction with society not only transcends as it is done by means other than the dissemination of the research done in the institution. In addition, the objective of the interaction should be not only to arouse interest in UFU but also to contribute to the development of autonomous and participatory citizens in society. In this way, the ideal is for such a relationship to be included in the guidelines document.

Also of similar importance to the adjustments proposed above, it is considered essential to create a specific topic for Public Communication of Science, which should form the basis of the Division of Scientific Divulgation, whose suggestions are put in the next topic. Throughout this research, it was emphasized not only the importance of science to society, but its inseparability from society and, therefore, it is necessary to reinforce such a relationship in the Guidelines.

It is important to emphasize that, in addition to textual changes in the document, it is important that the current UFU higher management and future administrations are aware of the university's responsibility to apply PCS values in all institutional works.

6.3 About the Division of Scientific Divulgation

It is important to highlight the initiative to create the sector of scientific dissemination of UFU as relevant. It shows the concern of the institution, through the Communications Department, with science, technology and innovation developed within the university.

Since its creation, the Division of Scientific Publicity has been working in a purposeful manner in the actions of science communication. With regard to the activities currently carried out by the sector, it is noted that some approach the PCS precepts exposed in this research. As an example, the "Ask the Scientist" event can be indicated, carried out outside the physical structure of UFU and focused on promoting a conversation with society on mental health issues.

Although that in the title of the event it is noticeable the focus on the scientist and his social hierarchy of delivering information to society - which is close to the PCS model of deficit, proposed by Lewenstein (2010) -, the event is constituted as an instrument of social interaction and in which it can be affirmed that there is feedback from society. In this context, a remark about the title of the event is advisable: for a possible next meeting of the type, the name could be: "How is your mental health?". Such a title option makes direct reference to the public and the UFU and USP brands, along with the position of the scientist, and are in a secondary position, however, no less important. There is a clear need for reflection on the necessity for the focus of PCS actions to be on society and not necessarily the institution or science.

The events "Communicate Science" and "Science on the Street" should also be highlighted as important initiatives of UFU PC, prioritizing discussions about the importance of communication of research carried out at university as well as knowledge, from outside society to university, of the studies produced by the institution. Although they do not reach a proposal of engagement with society and are more linked to the PCS deficit model (Lewenstein, 2010), these actions deserve to be highlighted, as they differ from what has been done so far.

In the same way, projects proposed in the internal plan of activities of the sector, such as training of researchers, excursions in schools and inaugural lecture on scientific dissemination, are fundamental actions in the context of communication and science and demonstrate concern of the institution with the thematic.

The dissemination through the website and social media is perhaps the measure that least approaches the PCS engagement model (Lewenstein, 2010), since it focuses on transmitting scientific information about UFU research without necessarily seeking an involvement with society for the exercise of citizenship of persons with access to content. Precisely because digital social networks are a good place for engagement, inclusion and participation, the way in which UFU science is disseminated in such media needs to consider the importance of investing more in the interaction and feedback of the public, which does not prevents the work of continuing to strengthen the institution's brand.

Thus, in addition to the dissemination of the research developed at UFU, it is proposed to evaluate the realization of events in which there is also direct participation on public policies for science, technology and innovation; such as forums, conferences and debates (in the framework of the Forum of Scientific Culture made by the UFMG Scientific Divulgation Board), with a

view to encouraging the subject's engagement, autonomy and empowerment (Duarte, 2018) on the issue of how government and institutional policies are conducted.

Another suggestion is found in Dirco's action plan, but it nonetheless reinforces the need to harness the potential of social media to promote inclusion and interaction with participants. Such proposals are based on the considerations of Haswani (2013, p. 98) by highlighting the emancipatory perspective of social networks arranged on the Internet, a characteristic that meets the basic principles of Public Communication of Science. The research considers that the engagement in the communication of science in UFU is still fragile, but with potential for improvement.

7. Final considerations

This article presents research results that had as object the Public Communication of Science in Higher Education Institutions, more specifically at the Federal University of Uberlândia.

In order to do so, it presented a bibliographical review, followed by data collection with the study of similar[vi] to the actions in the UFU, as well as support material and study about the existence and / or development of the PCS in other HEIs[vii], and also journalistic interviews with representatives of the current management.

It is understood that it is essential to return to the question again: what is the value of knowledge if not shared and applied? Is knowledge valid in and of itself? Once, in the words of Castelfranchi (2008), society and science are inseparable, knowledge must become public and, on the other hand, the public must have access to the knowledge produced, it needs to have real interest and participation in science and technology policies, until this network of flows functions autonomously, in which the idea of an inseparable binomial between science and society is so deeply rooted that it will not be necessary to fight to arouse interest and to publicize knowledge.

It is at this point that this research becomes not only important but fundamental. The expression Public Communication of Science is still, and probably will continue to be, object of studies, not only for the emergence of the theme, but for its amplitude and difficulty of implantation of the point of view of the engagement. The discussions are diverse, but they do not overlook the intrinsic PCS bias of serving the public and generating engagement, autonomy, empowerment, through the exemption of the hierarchy of the scientist and balance of powers

between the researcher and the non-researcher and in this sense, UFU's actions still need to be improved.

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[i] Prior to the creation of such space, all disclosure should be sent to the institution's website.
[ii] More information about the event available at: http://www.eventos.ufu.br/comunicaciencia.
[iii] Interview held in November 2018.
[iv] Information obtained in a newspaper interview conducted with the source in November 2018.
[v] For more information consult Cavalcanti (2018).
[vi] Not presented in this article.
[vii] Not presented in this article.