The increasing need for science communication! - A theoretical approach

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Abstract

There is an increasing need for more communication from the scientific communities. Often perceived as a closed and talking to limited audiences, today's world is putting further pressure to scientists to be more open to opportunity of bringing their research to the citizens. Based on a theoretical approach, this article aims to bring the latest debates focused on science communication, trying to open a new path of discussion and research in the higher education system in Albania.

Key words: *science communication, public understanding, audiences*

I. In search of a definition

From open talks of the ancient "Agora", to the public space of Habermas, from printing to a Metaverse reality, it seems that communication has been all-powerful in changing and reshaping societies. No matter the type of information or data produced it was soon understood that if people would not communicate and share results among them, politics, economics, culture, religion and science would not hold neither the importance not the identity that they have today.

From all the categories mentioned above, science, especially natural ones, appear to be the last in need of communication, given that its results and feasibility are far more concrete and easily to be perceived and/or experienced. This would still be true in the late 1950's, when C.P.Snow held his famous speech on the unbridgeable gab between the more mathematical sciences and humanities. Science had no chance to remain indifferent to the growing interconnectivity of the world and that is why the two hostile branches of knowledge had to come closer and closer, giving rise to more interdisciplinary scientific paradigms which had to be properly communicated to the world out there and its numerous audiences.

In a traditional perspective science has to be communicated because… "it [could provide] the public with information essential to forming opinions about public policy and about the costs and benefits of governmental expenditures on science (Treise and Weigold, 2002.pp. 23). Led by the idea that the majority of people lack interest on science, the deficit model, which has been predominant for many years, saw science communication… "as a oneway communication from experts with knowledge to publics without it"(D. Cheng et al. (eds.), 2008: pp). Based on this model of "Public Understanding of Science", from now on PUS, "science that transmitted by experts to audiences is perceived to be deficient in awareness and understanding" (ibid.119). In other words, audiences are hostile, ignorant and easily persuaded. Despite "the long-standing concern by science communicators about the prevalence of the "deficit model" thinking" (Besleyand, 2011,pp: 50)…things seem to be moving in a more positive direction. Van Dijik argues that… "despite its powerful echoes, PUS has recently been complemented by postmodern approaches, resulting in what [he calls] a "(multi)cultural" practice of science communication (van Dijck, 2003) and that the "increasing public knowledge about science, will lead to greater enthusiasm for science and technology" (Besley and Tanner, 2011). Furthermore, Van Dijik says that "he prefers more the term science communication over public understanding of science, because the latter still assumes an implicit hierarchy between the experts and the ignorant (van Dijck, 2003, pp: 63)

T.w. Burns,.J. O'Connor, and S.M. Stocklmayer (2003) have been working in proposing a more contemporary definition on science communication, trying to find if there exists any difference among the key theoretical concepts of this paradigm such as public awareness, public understanding of science, scientific culture and scientific literacy. They define science communication as "the use of appropriate skills, media, activities, and dialogue to produce one or more of the following personal responses to science: Awareness, Enjoyment, Interest, Opinion-forming, and Understanding" (pp. 74)… stating clearly that it cannot be used as a synonym of the terms mentioned above. "Science communication aims to enhance public scientific awareness, understanding, literacy, and culture by building AEIOU responses in its participants" (Burns, O'Connor and Stocklmayer, 2003, pp:102)… [by empowering] the public to attain an interest in science.

The vowel analogy AEIOU is a very empowering concept in the sense that it opens the path for a more constructive model of how science is communicated, leaving more space for dialogue and participation. It focuses more on the variety and inter-dependent publics who receive the scientific information and construct meaning based on their cultural practices. For Van Dijik (2003), "science communication implies reciprocity among all agents involved, a feature basic to a cultural practice" (pp. 68). The AEIOU acronym lets us know that the public is the ultimate goal of science communication, whose construction and message should be created based on the awareness, enjoyment, interest, and opinion and understanding ofit.

II. The public (s)

The public is not homogenous! - This has been one of the strongest critics that Nancy Fraser has against the Habermas's theory of public spaces. "The public" is a very heterogeneous group; it is as multifaceted and unpredictable as the individuals that compose it" (Burns, O'Connor and Stocklmayer, 2003, pp: 184). Within the society we could identify at least six overlapping groups "each with its own "needs, interests, attitudes and levels of knowledge" have been identified for the purposes of science communication activities and/or research (Levestein 1998, pp.1-3).

- "Scientists: in industry, the academic community and government.
- Mediators: communicators (including science communicators, journalists and other members of the media), educators, and opinion-makers.
- Decision-makers: policy makers in government, and scientific and learned institutions.
- General public: the three groups above, plus other sectors and interest groups. For example, school children and charity workers.
- Attentive public: the part of the general community already interested in (and reasonably well-informed about) science and scientific activities."Evaluation Associates, Ltd., Defining Our Terms (Evaluation Associates, cited 9/10/2000), http:\www.evaluation.co.uk/pus/pus_dfns.html
- Interested public: is composed of people who are interested in but not necessarily well informed about science and technology. (Miller, 1992)

This categorization of the types of audiences is important because we have to keep in mind that… "any science communication efforts need to be based on a systematic empirical understanding of an intended audience's existing values, knowledge, and attitudes, their interpersonal and social contexts, and their preferred media sources and communication channels"(Nisbet and Scheufele, 2009, pp: 123). For the purposes of this paper we will focus on three levels where science communication happens and those are: science to academia, science to policy makers and science to the general public. "Certainly, if a goal of public engagement is to promote mutual understanding between scientists, policymakers, and the public, then consulting with those members of the public who are the most directly affected, attentive, and active should be a priority"(Wynne, 2006)

III. Science to general public

Avoiding furthering clarifications on which the public is, this part of the paper focuses on the need of science to be properly communicated in the media. Given the wide range of mediums, public or private broadcasting companies, large numbers of newspapers and journals published around the globe and the increasing use of social media or alternative media, it sounds silly to claim that "*there is no room left where scientists can communicate science*". Studies have shown that despite several initiatives undertaken to improve science communication, the general public is not satisfied or worse not interested on what is being communicated, because "these initiatives …tend to reach a small audience of already informed science enthusiasts" (Nisbet and Scheufele, 2009, pp. 1768)."Science communication efforts grapple with a wider public that is for the most part unable or uninterested in developing an in depth understanding of scientific breakthroughs, and instead rely on cognitive shortcuts and heuristic decision making to help them reach opinions about policy-related matters (Popkin, 1991; Scheufele, 2006). Actual studies, focused on finding new ways to communicate science properly, identify three major causes that contribute to the actual state of art it and these are:

1. Lack of communication competency by the scientists;
2. Over-generalization of the media, especially journalists;
3. Scientific illiteracy of the audiences

Scientists as communicators

"You get pregnant, suffer morning sickness, experience sleepless nights, not in Seattle, but at your bed, give birth and then people come and say: the baby is the

copy your mother in law". With all respect to the mother in law, this is exactly the feeling a scientist gets when he sees how is research is used or described by the media: "his baby" loses originality and people forget him to remember only the headline his/her work occupied in this television or in that newspaper. Scholars argue that the fault for this relies on the scientists themselves… "[who] "reverted" to discussing intra-scientific communication—that is, communication within the scientific community (such as publishing papers or presenting at conferences" (Davies, 2008, pp: 23). In practice science is not the one who comes in contact with the audiences in a normative form, rather than as the product of the individuals or small groups that are put in contact with them… "and it is therefore the practices of individuals which will frame and shape the communication process"(ibid, pp:). Due to the fear from the "deficit model" that takes from granted the ignorance of the audiences, scientists prefer to stay in an isolated island, leaving more space to unqualified journalists or PR specialists to communicate their research results. Once Dr. Neal Lane, former head of the National Science Foundation, claimed that "with the exception of few people… we do not know how to communicate with the public, because we do not understand our audiences well enough…- it is difficult for them to hear us speak. We don't know the language and we haven't practiced it enough (fq.38).

Scheufele (2007) argues that effective communication is not a guessing game, it is a science" (p.48) and it is the duty of the scientist to be directly involved in the process of constructing the discourse on science. All those who practice science have to be… "challenged to be science communicators and to enter into dialogue with their peers, with the public, and with mediators" (Scheufele at al.).It is true that with the growing importance of science communication, scientist are eager in acquiring proper communication skills and in a research conducted by Hartz and Chappell in1997, results that more than 80 % of scientists are willing to take a course to help them learn to communicate better with journalists.

If we were to use an analogy, "the science communicators (mediators) may be thought of as the mountain guides. They teach people how to climb (skills), provide ladders (media), assist with the actual climbing event (activities), and keep climbers informed about progress, possible dangers, and other issues related to the climb (dialogue)"(Burns, O'Connor and Stocklmayer, 2003, pp:194). One reason why scientists should celebrate is that the ladders, so the media, offers a wide range of alternatives to be used by them as a communication space. Being it a "traditional ladder" as the TV or newspaper or a virtual one as the internet and cyberspace, the scientist can make the best of choices based on the research or communication style. It is not important to provide with scientists and researchers with "a science communication tool kit"; rather than tools they need to understand that "science communication...empowers the public to attain ".

Gossips, spectacles, advertisements, political scandals, sexuality and economics are more than enough to cover the life of the place where there is always light, the television. Said this, scientists are often lamenting of the small place being given in the TV or even in other mediums, such as daily newspapers and even when they find that space, …. "[they] complain that the press [or TV-s] oversimplify… [and run] to sensationalist headlines that make nonsense of the careful caveats in which research papers tend to be wrapped" (Rose, 2003, pp: 311).In a way they are right and the fault for this lies on the lack of qualification of those who cover science in the press or television.

Brumfi (2009) argues that… "even leading national media outlets are investing less and less money in staffing their newsrooms with science writers, meaning less coverage devoted to important scientific topics". (pp: 89). This lack of expertise is faced with the "obsession" of the scientists, who perceive themselves as experts, infallible, showing zero tolerance for the bad transformation that their data have to go through to reach audiences. "In contrast, journalists contend that scientists lack a basic understanding of the journalistic process and the communication skills needed to relay information to the public" (Nelkin, 1996; Tanner, 2004; Willems, 2003).In an ideal world this clash would not have existed, because each one has to take an ethical responsibility in doing his job properly, scientists the research and the journalists its coverage. "Some critics…..have argued that scientists should stick to research and let media relations officers and science writers worry about translating the implications of that research (Holland et al., 2007).

The naked truth is that both parts lack expertise and have not found yet a model of successful partnership. If researchers are often condemned for not being able to explain themselves through mediums, scholars argue that media outlets tend to hire one person who covers many fields. "For example, research suggests that those who cover science frequently lack any but the most cursory backgrounds in the sciences..." (Treise and Weigold, 2002, pp:) and this lack of expertise may contribute to widespread error in reporting on science (Ankney,Heilman,andKolff 1996). In other word rather than by science journalists, science in media outlets is usually covered by regular reporters. For Friedman (1986) it is due to the journalistic values that reporters create short term focus on science. He says that:

> Editors and reporters tend to value stories that contain drama, human interest, relevance, or application to the reader, criteria that do not always map easily onto scientific importance (Friedman, 1986)

This delicate, yet prevailing conflict between the researchers and journalists appear to be seizing to exist due to the strong influence of the internet and new media. If in the traditional media, scientists had to be in the same frequency with the journalists, the internet offers a wide range of communication tools for them in order to communicate science properly. Today is more than normal to see scientists to have a twitter or Facebook page, share their speeches on their YouTube channel or manage a blog followed by many. The scientist "is the creator" of his/her own message and selects the medium he/she considers to be the most convenient. Said this, rather than parallel lines that never meet, the relationship among scientists, media and journalist is interconnected nowadays

Studies suggest that… "when science communication professionals stand for the choice which medium to use in their efforts to communicate science, they should take into account how the public uses television and the Internet, and how effective these media are in exchanging information"(Koolstra, C.M;. Bos,Mark J.W and Vermeulen. I.E, 2006; pp. 1). "Based on empirical studies conducted in Europe….the old mass medium television should still be regarded as the most important medium for science communication, because (1) people use television more frequently than the Internet, (2) television is more effective in transferring messages to the public than the Internet…"(pp.1). For Van Djick the reality is much more complex than a simple calculation of uses and gratification of the audiences, stating that:

> "The "media" [no matter which one]…no longer mediate between experts and lay persons but are actors in processes of construction and dissemination. The media, like science, is not something out there, bound to disseminate messages or expose a mass audience to experts' knowledge; media is equally distributed, heterogeneous, and equally implicated in the construction of science as part of culture"(van Dijck, 2003, pp:15)

Audience's Scientific (IL) literacy

Are people interested on science? Are they aware or do they understand what science is about? These are some of the questions that pop out when science communicators tend to analyze the role of the audiences when constructing their messages. Given that in most of the cases, people in the society are perceived as the ultimate goal of science communication, it is important to talk about the scientific literacy of the audiences.

The term itself has changed during the course of the years and for many scholars this is due to… "its complex and dynamic nature rather than to a lack of definition" (Jenkins,1994, pp: 602). Burns and his colleagues argue that…

"Scientific literacy is the ideal situation where people are aware of, interested and involved in, form opinions about, and seek to understand science(Burns, O'Connor and Stocklmayer, 2003, pp: 190). No matter if it is a practical, civic or a cultural scientific literacy, it should be fundamental, especially for countries as Albania and Serbia, to include scientific literacy in the school curricula… [by] helping [citizens, youth above all] to be interested in and understand the world around them, to engage in the discourses of and about science, to be skeptical and questioning of claims made by others about scientific matters, to be able to identify questions, investigate and draw evidence-based conclusions, and to make informed decisions about the environment and their own health and well-being" (Hacking, M.W; Goodrum, D; Rennie,J, 2001; pp: 6-7)

Although studies can testify an increase in scientific literacy, thanks to the several initiatives taken by universities, private research institutes and even media outlets, we should be watchful in confounding awareness with understanding; the first means that audiences "are not ignorant" about science's existence and is out there influencing their lives, while the later includes a higher and deeper level of meaningful interaction with the scientific information they receive. Said this, despite the discrepancies among scientists, journalists, media outlets, science communication has a higher goal to achieve and that is to make the public understand that "[they] need to be scientifically literate to live well in modern societies, and scientific literacy remains the basic target of all the efforts of the science communication community"(Donghong, Ch; Claessens,M; Gascoigne, T; Metcalfe,J; Schiele,B and Shunke,Sh (2008): pp:154)

IV. Conclusion

Latest research show that the scientific communities are considerably more open in embracing open science. Many countries and universities are paying further attention to how research are being communicated broadly, aiming to make science and research more accessible to citizens. Still, in countries as ours the need for more science communication comes with the need for more qualitative research by universities and think tanks. Even though the new research assistants in Albania are being trained in being better communicators and to consider media and audiences as science's allies, universities are striving to produce research and scientific projects that have a general impact on the society and sustainability of the country. Lack of infrastructure, qualified staff, lack of collaboration among higher education institutions and most importantly a missing relationship between universities and political decision bodies, has made it difficult for science to be communicated properly among larger audiences in Albania.

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