MAPPING SCIENCE COMMUNICATION ACTIVITIES IN ITALY

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Abstract

The key objective of this research is to identify the range of science communication activities that are currently undertaken in Italy, focusing on logics, expectations, methods, and goals, with the aim of building a map of these activities.

In our society science is acquiring an increasingly important position by playing a crucial role in many social problems. In this context, scientific communication becomes indispensable to move people closer to the science world, its problems and its important effects on our lives. In Italy, in the last few years, many activities are being born. In this composite outline, a general analysis to define the main lines is lacking. Through a tri-step study, that includes a desk, qualitative, and quantitative research performed by a multiple choice questionnaire and interviews, we built a rudimentary map of science communication in Italy defining a specific universe. This universe will allow to build a representative sample to be used to obtain a comprehensive map. This map could become an useful tool to analyze and evaluate science communication dynamics in this country and to develop new projects and strategies in this area.

Key words: Map, science communication, Italy

1. Introduction

In recent years public and private institutions, companies, and research institutes have been dedicating much more attention to an area poorly considered in the past: science communication.

In Italy too, many different activities were born to move people closer to the science world. Many events, different for organization, scientific discipline covered, objectives, types of activity, location, financing, professionals involved and context, are being organized, each one with peculiar characteristics and communicational strategies. With an offer so rich and diversified, there is an emerging evidence that Italy lacks an appropriate consideration of science communication and its trends, defining logics, expectations, methods, goals, and successes and highlighting possible improvements or deficiencies. Since science communication has a crucial role as a go-between of science and society, a need is increasingly felt of obtaining an accurate picture of science communication in Italy, the goal of our research. This picture might become an useful tool for communicators and professionals, both to analyze and evaluate science communication dynamics in Italy and to develop new projects and strategies in this area to facilitate the public involvement in public debates. At the same time the results of our study will allow an useful comparison with activities, strategies and dynamics in other countries, especially in comparison with studies conducted to establish the current state of science communication and public understanding of science for example in Europe [1].

In our research we have considered a previous work that has been done in UK and carried out by Research International [2].The methods employed in this first phase of our research were based on a qualitative analysis, performed through interviews, and a quantitative analysis, performed through interviews and questionnaires. These two analyses were based on a sample of science communication organization built through a desk research. This study would like to highlight, for each organization identified, some important topics such as type of activity organized, strategy adopted, objectives, general organization (staff, funding, etc.), possible influence on science communication.

At the moment, our research is still a work-in-progress and we can present only preliminary results, deriving mainly from desk research and qualitative research.

It is important to underline that this study aims to build a rudimentary map of the different types of science communication activities existing in Italy, the target audience, the motives/rationale, the dynamics, identifying the main lines. A comprehensive list of activities is not within the scope of this work.

2.Methods

2.1. Subjects

We tried to include organizations involved in science communication in Italy. With desk research (that continued throughout the study) a sample of 22 organizations was created for the qualitative stage. The sample for quantitative stage was obtained through desk research and the evidence acquired from the interviews (with a "snowballing" effect, the act of asking an interviewee to generate lists of other appropriate respondents). In this way, 160 different

organizations were identified and selected on the basis of different size, geographical area of influence (from local to national), structure, target audience, topics, aims, funding, organizers, context. For each organization a reference contact with telephone, address, and e-mail was selected.

Table 1. The categories identified for the quantitative analysis

Mass media	□ Newspapers □ Magazines □ Radio and TV □ Book publisher □ Internet sites □ Other media organization
Association	□ Cultural □ Charity and humanitarian □ Medical □ Environmentalist □ For professionals □ Other association
Public body	□ Ministries □ Local government □ Criminal Scientific Investigation □ Courts □ Bioethical Commissions □ Research organization □ Other public body
Teaching/education	□ School □ Universities □ Master □ Vocational training □ Other educational establishment
Organization involved in science communication	□ Science Festivals □ Museums □ Science centre □ Natural parks □ Aquarium □ Planetarium
Party	
Foundations	
Industry	
Artist	

2.2 Tools

We employed an approach typical of social research, combining desk research, qualitative research, and quantitative research. The desk research was used to identify the organizations to include in the qualitative and quantitative researches. We didn't have at our disposal a catalogue or list to identify organizations involved in science communication, therefore web research and literature review (leaflets, newsletters, etc) were used to create the appropriate sample. Qualitative research was performed through face-to-face telephone interviews with providers of activities and specialists in science communication. Quantitative research was conducted through two different methods: telephone interviews and a web-based questionnaire. In every case the telephone interviews were based on the questionnaire. The different steps followed in this research will be described in the following paragraphs.

2.3 Procedure

2.3.1 Desk research stage and qualitative stage

Initially, several categories presumably involved in science communication were selected. With a desk research a first sample of 22 organizations was identified for the qualitative stage, the first part of the project. In this stage 18 telephone and 4 face-to-face interviews with providers of activities and specialists in science communication were performed. The interviews did not have an established structure and were conducted as a dialogue focused on exploring the themes listed in table 2.

Table 2. Themes explored in the qualitative stage interviews

Type of activities
Strategies adopted
Objectives
Communication choices and relative reasons
Criteria to monitor success
Role of organizers
Funding
Considerations about science communication

New categories presumably involved in science communication discovered during this phase were added to the starting list. The final categories identified at the end of the qualitative phase, to be used for quantitative analysis, are listed in Table 1.

2.3.2 Quantitative stage

On the basis of the data obtained in the qualitative stage, a web-based questionnaire was built. In the questionnaire we explored the points emerged from the interviews, which we considered useful to create a map of activities in science communication. The questionnaire included eleven different questions with multiple-choice answers.

The different topics selected for the questionnaire, together with a short explanation, are listed in Table 3.

Table 3. Topics reported on the questionnaire

Topic	Explanation
Type of organization and reference area	In table 1 there is a list that is essential to identify the kind of organization engaged in science communication
Objective of activities in science communication	Commercial purpose, to encourage general science interest, to inform or to discuss and compare topics of public significance are some of the many different reasons that push each organization to engage in science communication
Kind of activities	We have identified 32 different subclasses of activities that refer to the following categories: Media School and universities Meetings Artistic events Exhibitions Laboratories Competition For possible activities not reported, a blank space was provided.
Scientific disciplines covered by the science communication activities	Biosciences, environmental sciences, technology, chemistry, and what else? The different events include one discipline or more? General science is preferred to a single discipline? Those are some of the questions that we would like to answer in this part.
Occasion for science communication activities	From desk and qualitative research an interesting variety of circumstance emerged, in which science communication activities were performed. From celebration or anniversaries related to scientific events to commercial reasons, the range of situations that involved science communication is very rich and probably not well known.
Locations	In the last few years science has left locations traditionally deputed to communication to discover new places. Our aim is to identify a range of

	locations where at the moment science communication is performed in Italy.
Target	Healthcare professionals, scientist, journalists, children, teachers, and many other categories including general public are the target of different events.
Staff	In this part we aim to identify the figures involved in the organization of the different activities.
Success	Which is the method adopted by each organization to monitor the success of their activities? Is there a real interest in this sense? To check and judge the real success of the activity is an essential tool to plan and define new strategies to communicate
Funding	There are many different ways to finance the activities. For this reason it could be very interesting to trace an outline in this sense

The questionnaire was sent by e-mail to 160 different organizations. A person at each of them was called by telephone to make sure that the questionnaire had arrived . Only a part of the questionnaires were returned as required. Frequently many follow-up calls were necessary. A significant part of the questionnaire were filled through telephone interviews. Observations not included in the multiple-choice selection were reported in the section «Other».

3. Analisys

We will analyze the data obtained in the qualitative analysis and the preliminary data of the quantitative analysis. Our data are not sufficient for firm conclusions on science communication; however, interviewees' opinions, comments of professionals, and questionnaire analysis make it possible to describe the main features of science communication in Italy. These can suggest new developments of our research. At this stage, we will focus our analysis on the topics reported in table 4. In the future we intend to build a more comprehensive picture.

Table 4. Topics object of analysis

Type of activities and communicative strategies adopted
Objectives
Context and location
Target
Staff
Criteria to monitor success
Funding and role of organizers

3.1 Type of activities and communicative strategies adopted

The diverse activities reported by our interviewees vary according to the target audience. Communication targeted to professionals and scientists relay on traditional ways (conventions, symposia, stages). Communication target to other audiences is significantly more diversified, particularly when directed to a general audience. There is an attempt to link science to everyday life by locating conventions, laboratories, expert panels, exhibits, and shows in streets or shops. At the same time, science communication is associated to artistic events (concerts, theaters, movie theaters) thus linking communication to other cultural activities. Our interviewees think that directly involving target subjects (general audience, teachers, communicators, students) in laboratories or hands-on activities is a very effective communication strategy. As for health and patients' associations, meetings of patients and experts and capillary information within the hospitals are thought to be of paramount importance.

Table 5. Type of activities

Mass media	□ Articles on newspapers or magazines □ Books and other publications □ Web sites /cd-rom □ Movies / documentaries / videos	□ House organs □ Posters/brochures □ Newsletters □ Press communiqués
School and university	□ Courses □ Contests □ Activities organization □ Participation to cultural festivals	□ Laboratories and animation □ Meetings with popular scientists or testimonials □ Participation to specific public utility projects
Professional formation	□ Courses	□ Laboratories

	□	Meetings	
Education	□ Courses □ Meetings	□	Informative meetings with patients and their family
Conventions/meetings	□ Meetings with experts □ Public lessons □ Meetings with popular scientist or testimonials	□ Public debates □ Café scientifique □ Participation to cultural festival	
Artistic events	□ Theatre/Cinema/Photos □ Literature/philosophy/ history	□ Sculpture / Painting / Installations □ Music	
Exhibits	□ Temporary exhibits	□ Itinerant exhibits	

3.2 Objectives

Why do different entities organize science communication activities? Table 6 lists the answers provided by our interviewees. We want to underscore that all interviewees gave more than one answer, meaning that all activities are planned and organized to reach more than one goal at the same time. Apart from businesses (industries, publishers) who use science communication to advertise their products, there are two interesting fields. On one side we observed an effort by different organization to move the public closer to science by defusing the natural diffidence towards fields thought as 'difficult'; oh the other, there is a need, increasing felt by public and scientists alike, to meet and discuss on current events or general interest news about science.

Table 6. Goals of science communication activities

□ To encourage a general interest for science □ To teach science □ To discuss topics of general interest □ To inform □ To advertise organization activities or products □ As part of a program of social utility □ To answer to public demands □ Science communication is one of the organization missions □ The organization profits by science communication □ To encourage young people to begin scientific studies and careers. □ To exploit and support categories of professionals □ To move the public closer to scientific topics or subjects believed too difficult or remote from general way of life

3.3 Scientific areas

We asked our interviewees to list the scientific areas involved in their science communication activity. Briefly, the answer is all. Table 7 lists scientific areas reported by interviewees.

Table 7. Scientific areas in science communication

Medicine
Molecular biology/biotechnologies
Natural science
Physics
Chemistry
Mathematics
Astronomy and space
Environment
Electronics and technologies
Engineering

3.4 Context

We identified six different contexts in which science communication activities are carried out. They are listed in table 8:

Table 8. Context identified

Events dedicated to science
Events not expressly dedicated to science
Presentations of activities or new products

| Specific projects |
| Regular communication activity |
| Regular work activity |

When the activities are organized for a particular event or recurrence or, as is often the case for museums, science centers, and research institutions, are part of regular communication activities, science communication is used also to advertise activities or products (this is particularly true for private interests as industries, publishers, etc.) We also found science communication activities in locations usually considered foreign to science like city fairs, village or neighborhood festivities, sport competitions, and other such occasions, all characterized by large attendances. Our interviewees think that inserting science communication in unusual but popular contexts stimulates people's interest. In Italy there seems to be nobody dedicating their whole work activity to organizing artistic events dedicated to science communication.

Table 9. Lists contexts reported by interviewees

Mass media	□ Events dedicated to science □ Events not expressly dedicated to science □ Presentation of activities or new products	□ Specific projects □ Regular communication activity □ Regular work activity
School and university	□ Events dedicated to science □ Events not expressly dedicated to science □ Presentation of activities or new products	□ Specific projects □ Regular communication activity □ Regular work activity
Professional formation	□ Events dedicated to science □ Events not expressly dedicated to science □ Presentation of activities or new products	□ Specific projects □ Regular communication activity □ Regular work activity
Conventions/meetings	□ Events dedicated to science □ Events not expressly dedicated to science □ Presentation of activities or new products	□ Specific projects □ Regular communication activity □ Regular work activity
Artistic events	□ Events dedicated to science □ Events not expressly dedicated to science	□ Specific projects □ Presentation of activities or new products
Exhibits	□ Events dedicated to science □ Events not expressly dedicated to science □ Presentation of activities or new products	□ Specific projects □ Regular communication activity □ Regular work activity
Laboratories/animations	□ Events dedicated to science □ Events not expressly dedicated to science □ Presentation of activities or new products	□ Specific projects □ Regular communication activity □ Regular work activity
Contests	□ Events dedicated to science □ Events not expressly dedicated to science □ Presentation of activities or new products	□ Specific projects □ Regular communication activity □ Regular work activity

3.5 Location

Our interviews show an interesting change in progress. Institutional places (museums, research institutions, science centers, etc.) host most events and activities dedicated to science communication but there is a trend towards unconventional locations especially for events dedicated to general audiences. Animations, laboratories, and temporary exhibits are being increasingly organized in streets, squares and other public places which become a meeting point between public and experts. This is true also of the natural environment. Table 10 lists the different locations reported by the interviewees.

Table 10. Location reported by the interviewees

Mass media	□ editorial staff	□ Office
School and university	□ Scientific institutions □ Organization headquarters □ Museums □ Streets	□ Stand □ School or university □ Nature (forests, beaches)
Professional formation	□ Scientific institutions □ Organization headquarters	□ School or universities □ Convention centers
Conventions/meetings	□ Scientific institutions □ Organization headquarters □ Convention centers	
Artistic events	□ Scientific institutions □ Organization headquarters □ Museums □ Streets	□ Festivals □ Schools and universities □ Nature (forests, beaches) □ Stand
Exhibits	□ Scientific institutions □ Organization headquarters □ Museums □ Streets	□ Festivals □ Schools and universities □ Nature (forests, beaches) □ Stand
Laboratories/animations	□ Scientific institutions □ Organization headquarters □ Museums □ Streets	□ Festivals □ Schools and universities □ Nature (forests, beaches) □ Stand
Contests	□ Scientific institutions □ Organization headquarters	□ Schools and universitis □ Museums

3.6 Target

Our analysis shows that the type of communication activity chosen is based on the target audience. Table 11 lists the target audiences reported by different types of interviewees.

Table 11. Target audience

Mass media	□ General public □ Children under 14 □ Children over 14 □ Adults □ Patients and patients' relatives	□ Scientists □ Teachers □ Members □ Physicians □ Communicators/journalists
Schools and universities	□ Children under 14 □ Children over 14	□ Students □ Teachers
Professional formation	□ Students □ Communicators/ journalists □ Employees □ Scientists □ Physicians	□ Teachers □ Professionals □ Members □ Patients and patients' relatives □ Volunteers □ Scientific communicators
Conventions/meetings	□ General audience □ Children under 14 □ Children over 14 □ Adults □ Patients and patients' relatives □ Employees	□ Scientists □ Teachers □ Members □ Physicians □ Communicators/journalists □ Volunteers
Artistic events	□ General audience □ Children under 14 □ Children over 14	□ Teachers □ Members □ Communicators/journalists
Exhibits	□ General audience □ Children under 14 □ Children over 14 □ Adults	□ Teachers □ Members □ Communicators/journalists
Laboratories/animations	□ General audience □ Children under 14 □ Children over 14	□ Teachers □ Members □ Communicators/journalists

	□ Adults		
Contests	□ Children under 14 □ Children over 14	□ Students	

3.7 Staff

We investigated the professional profiles of people who plan, organize, and carry out science communication activities. Our results show a diverse pictures. According to our interviewees the main determinant is the type of activity. We asked whether every activity were carried out by staff members. Most interviewees reported employing external personnel (consultants and professionals). In the case of educational activities the participation of children and students to the organization of the event is an integral part of the process. Table 12 lists the different professional profiles of staff members and external personnel.

Table 12. Staff

Staff members	Non-staff members
Teachers	Teachers
Students	Students
Young researchers	Young researchers
Scientists	Scientists
Physicians	Physicians
Communicators	Communicators
Administrative personnel	Other professionals (artisans, architects, engineers, fashion designers, etc)
Directors	Directors
Commercial personnel	Commercial personnel
Grafici	Artists, writers, intellectuals
	Volunteers
	Sympathizers
	Press agencies

3.8 Criteria to monitor success

Newspapers and magazines use the number of copies sold. Television and radio can estimate their success using Auditel and Audiradio, (sampling techniques used to evaluate programs' audience). All other organizations rely mainly on tickets sold, number of participants or applications submitted. Some organizations involved in science communication gave considerable attention to this aspect by preparing and analyzing questionnaires, questions asked the public, focus groups, or specially appointed evaluation committees. For commercial organizations involved in science communication as a means of advertising their products, the main criterion is sales. Evaluation of press reviews and interest is another way of evaluating the activity impact. Since monitoring activities requires additional funding, which is available only to major organizations, and since no interviewee declared not to monitor the success of their activities, many interviewees monitor their success on the basis of subjective perceptions. For organizations mainly based on volunteer work and liberalities, fund raising is another criterion. Criteria to monitor success reported by our interviewees are listed in table 13.

Table 13. Criteria to monitor success

Number of participants
Tickets sold
Questionnaires
Value commission
Sponsor or other organization feedback
Applications submitted
Subjective Perception
Products sold
Focus group
Reviews
Paper submitted
Media interest
Participation requests
Site visits
Number of members
Information requests/contacts
Funds collected

3.9 Funding

Public funding is insufficient to cover costs of most activities which must rely also on private funding of diverse origin. Science festivals, temporary and itinerant exhibitions, and different events need to be funded by interested private businesses. In this way, the role of the sponsor changes from mere financial backer to an actor in the event organization. Businesses investing in science communication declare to do it to advertise their products and to increase their prestige.

We have observed also an exchange of activities between organizations. It is a kind of bargain in which paucity of resources is compensated by a lively cooperation between science communication organizations.

The importance of volunteers, though mostly unrecognized, is fundamental especially for organizations operating in health, environment, humanitarian activities, culture, and assistance to the sick. Their role includes both personal work and economic help (through liberalities and fund raising).

There is also a 'volunteer' work made by scientists and other intellectuals involved in events such as public meetings about news of public concern (e.g.: GMOs, stem cell, environmental issues).

Table 14. Funding

Own funds
Public funding
Donations
Members fees or contributions
Sponsors
Tickets sold
Participants contributions
Profits
Collaboration with other organizations
Exchange of activities or competences
Work by volunteers
Volunteers' liberalities

As we already stated, these results will be subjected to a more comprehensive study that will be done when more data are available.

4.Conclusions

Our analysis shows a rough picture of science communication in Italy. This work followed three steps: a desk research, a qualitative research through interviews, and a quantitative research through interviews and questionnaires. The data we report are the result of the analysis of the qualitative interviews and the preliminary analysis of the quantitative data. For this reason we chose to report questions and answers following the questionnaire structure.

This preliminary analysis shows a diverse picture with some interesting features. There is an apparent effort by entities involved in science communication to diversify their offer by increasing the involvement of their target audience. The context in which the activity is performed seems to be important: science communication leaves its traditional outline to reach new and unusual locations and situations such as streets or the wilderness, where conventions, laboratories, discussions with experts, exhibits associated to artistic events (concerts, theater plays, movies) frequently take place, thus extending the communication process At the same time communication is focusing on an intensive process that aims to actively involve, hands-on, the target audience. On the other side, communication directed to specific targets, such as scientists, professionals, employees, patients and their families, is more traditional and is based on frontal lessons, conventions, and information by and discussions with experts

There is a diverse combination of professional profiles involved, based mainly on the type of activity. Most organizations need to rely also on external consultants, hired on a case-to-case basis, to plan and organize their activities. In all cases, organizers deem important to monitor success in order to plan future activities. Success monitoring is often conditioned by funding, a problem reported by all interviewees not belonging to major commercial organizations.

Problems in fund raising are important for all organizations not interested in linking science communication to product advertising. They make do in different ways: members fees, liberalities, cooperation with other organizations, competence exchange, and cooperation with sponsors.

When data collection has been completed, we will cross our data to obtain a preliminary picture of science communication in Italy; this will be useful to describe a finite universe of entities involved in this sector. This universe will be used to extract a representative sample to be used to build a complete map of science communication in Italy. At the end of the work, we hope to have a strategically and politically useful tool to understand communication dynamics and to plan new communication strategies.

5. References

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