

“SCIENCE POPULARIZATION IN MOTION”

**DR. JAAP WILLEMS
FACULTY OF SCIENCES
UNIVERSITY OF NIJMEGEN/FREE UNIVERSITY OF AMSTERDAM**

MADRID, CPCT 21-24/5/91

New forms and means of disseminating knowledge have become major instruments in broadening the basis of the popularization of science. Through such means, the attention of sections of the public with a limited education, or people whose interest is not easily excited, may be drawn. For this reason, science popularization will have to be continually rejuvenated during the nineties.

Some classical forms of popularizing science have obvious advantages in comparison with the mass media. They offer opportunities to turn the process of disseminating information into a real two-way communication process.

The view of the future which was recently published by the foundation PWT (Publieksvoorlichting over Wetenschap en Techniek) also points at this need to change the way in which science and technology have been popularized so far. This foundation, which has just celebrated its jubilee, advocates a more direct way of disseminating knowledge, that is, communication with the general public supplementing classical science popularization through the media.

Not only does the foundation PWT advocate a more broadly-based approach, but it also sets an excellent example; over the last few years, the foundation has brought about several new pathways in science popularization. Some examples of this are the science phone, Professor Post and public lectures. Some of these, such as the science phone, are successful, others, like the public lectures, are experiencing initial problems. In autumn the foundations PSW and National Science Week organize an international one day's workshop on New Roads in Science Popularization.

A large majority of the organizations active in popularizing science and technology in the Netherlands, businesses and government agencies still seek publicity mainly through press releases, domestic periodicals and other printed matter, leaning strongly on traditional science popularization.

Only the new medium of the open day has gained greatly in popularity, and has become part of the standard package of many organizations. Also inspired by the success of the biennial Opne Chemistry Days, an increasing number of organizations now and again open their doors to the general public. Especially schools have embraced the idea of the open day.

Last year, in response to a request from the foundation PWT, the study group for Science Popularization of Nijmegen University produced a manual on organizing open days. Within several months, hundreds of copies of this manual had been circulated.

We can say that this desired tendency, this movement away from information dissemination through the mass media towards communication by means of direct contact, is slow to get under way. This cannot be blamed on unfamiliarity with the available possibilities. In the literature, direct contact as a means of disseminating scientific knowledge has been promoted for quite some time. As far back as 1980, De Lang wrote that an information stream generally benefits only a small, well-educated elite. If we wish to reach the general public, a secondary data flow will have to be generated. De Lang calls this the "communications stream". In 1983 I produced a textbook titled (Science popularization, a different way?) in which a number of communications channels are discussed, such as open days, guided tours, group conversations and exhibitions.

In the view of both de Lang and myself, the desired change in direction necessary in popularizing science is a shift from one-way information delivery towards real communication. This definition is not without problems, since the terms "information" and "communication" are not defined unequivocally. In the present framework, I regard the classical dissemination of scientific information as the activity where one person, the sender, provides others, the receivers, with information by means of the mass media. "Communication" consists of an activity where a sender provides receivers with information by means of personal contacts. The term "New roads" is also not without problems, because a number of communication pathways between science and society are anything but new. Lectures on scientific subjects were popular in Britain during the last century, and scientific demonstrations were carried out by nineteenth-century societies. Still, we use this term because it is new in science popularization.

Why this shift?

Why has this shift from the classical form of science popularization towards communication become necessary? After all, more people are reached by means of the mass media, such as newspaper or TV, than by

open days or public lectures. A newspaper article is cheaper and demands less organization than, for instance, a guided tour. There are, however, at least four reasons why communication with the general public is preferable to information dissemination through the old and trusted mass media. Two of these reasons are practical in nature, the third and fourth are related to the yield.

One: science journalism can no longer cope with the growing supply of information;

Two: journalists occasionally (or frequently) distrust press information officers;

Three: the yield of information presented through the mass media is probably less than that of direct communication;

Four: society has become more adult and critical, and people wish to see things for themselves, hear information by themselves and to be in the position to ask questions.

Science journalism has not been able to keep up with the rapid developments in science popularizations. Because of the increase in the number of press information officers, mainly in universities and companies, the supply of information has grown tremendously over a short period. On the other hand, the general public's demand for information on science and technology has also grown hugely. The traditional channel connecting science and community, the press, cannot cope with the demand and the supply.

During the last years, the quantity of information on science and technology presented in Dutch newspapers has grown. The recently concluded investigation by Hanssen shows, among other things, that in 1990 2.5 to 5 percent of the available editorial space in six major Dutch newspapers was devoted to science and technology. This is more than some ten years ago, when Vonk measured no more than 2 percent. However, the increase in space is insufficient to cope with the greatly increased supply and demand.

Within the community of science journalists a certain distrust is sometimes felt towards press information agencies. Many journalists suspect information officers of improper motives. Due to competition between universities, for instance, the dissemination of scientific knowledge could easily degenerate into PR or even straight advertising.

This distrust is obviously caused by the fact that certain press information officers are also involved in attracting funds, students or both.

In what ways does this distrust manifest itself? An investigation, carried out in 1988, shows that both press releases and personal information from press information officers score very low on science journalists' list of possible sources of scientific information. Press information officers who are unable to release sufficient information through science journalists, are forced to seek other roads. This can be done by publishing domestic journals or by seeking direct contacts with the general public. This is still not done often enough.

Investigations into the area of mass communications keep supplying new evidence of the limited effects of the dissemination of scientific information through the mass media. Stappers et al summarized this succinctly some time ago. Investigations into Tichenor's "knowledge gap hypothesis", the theory of selective perception, the adaptation theory, diffusion research and other mass communication schools indicate that mass media are rarely able to effect drastic changes in people's opinions and attitudes. The frequently mentioned return to the powerful media is obviously still in its initial stage.

Information science, which addresses the personal communication between sender and receiver, is much more optimistic in this respect. Information science assumes the existence of methods (particularly in persuasive information dissemination) which can influence people's attitudes into the desired direction. This, too, causes certain science popularisers to pay more attention to communication with target groups instead of just providing these groups with information.

Finally, science popularization increasingly faces an adult and critical audience, which is not only interested in reading about the latest scientific developments in the science supplements, or seeing these developments on TV, but which also wants to ask questions and to discuss these matters. The information stream in the mass media only keeps people informed about what is happening in science. Open days, festivals, public lectures with discussions, science centres and demonstrations enable the public to experience, see, hear, taste and smell things for themselves. During personal contacts with scientists, the public can ask questions and give suggestions and criticisms. This, too, may be an argument for the desirability of this shift from giving information towards communicating.

Characteristics

The advantages and disadvantages of communication channels are best judged by their characteristics. What are the characteristics of these so-called new roads?

There are at least three points where communication channels such as open days, festivals and lectures differ from information dissemination through the mass media:

- direct contacts between scientist and public are possible;
- multimedia approach of the public is possible, and finally;
- social interactions can occur within the target group.

The dissemination of scientific information through mass media nearly always involves indirect contacts. The receivers read in the newspapers or see on TV what a journalist has grasped from the things the scientist has to report. The public is hardly if at all capable of responding to the journalist's information; the traffic is nearly always one-way. On open days, however, the scientist can tell the public about the latest results. In many cases, the middle man is left out. The other roads in science popularization, such as festivals, lectures, theatre show, contests and clubs also frequently involve direct contacts with scientist. If the scientist is not present in person, personal contacts with the intermediary, usually a press information officer, are always possible. In some forms of science popularization, these contacts will be quite intensive, for instance Professor Post, science weeks and theatre. In other cases, the direct contacts will be more distant, for instance in lectures and science centres.

New roads in science popularization are frequently multimedia in character. The dissemination of information through the mass media usually involves only one channel, and therefore the stimulation of only one sense. Direct contacts with scientists and information officers usually involve more media. This table, taken from the PWT report New Roads, displays a number of examples.

Table 1

Use of media in science popularization

	po	fo	de	le	ex	lec	th	cl	other
Professor Post		x							2
Technika		x	x						3
Jet Centre		x	x						2
JOS Club		x		x				x	1
Planetarium		x	x	x					2
Science Week	x	x	x	x	x	x	x	x	4
Science by Phone		x							2
Theatre							x	x	3
Public Day	x	x	x		x	x			4
House of the Future		x				x			4
Explorama	x		x		x	x	x	x	3

po= poster, fo= folder, de= demonstration, le=lesson, ex= excursion, lec= lecture, th= theatre, cl= classproject, other= nummer of other media.

The third characteristic of science popularization through communication is the social interaction within the target group.

Reading a newspaper, magazine or folder, watching TV etcetera is usually done on one's own. Visiting science centres or open days, attending lectures or clubs, visiting museums are usually done by groups of people, for instance families, school classes or societies. When a group of people acquires information, social interactions usually occur. Aspects of the subject will be discussed again during breaks, on the way home etcetera.

Results

The characteristics of these New Roads may influence the yield of science popularization both favourably and unfavourably. Possible favourable consequences are:

One: the possibility of adapting the offered information to the target group's level;

Two: the possibility of the scientist or information officer obtaining information from the target group;

Three: the increased variation in the available information, due to the multimedia approach;

Four: improved processing of the available information because of social interactions in the target group.

The personal presentation of information enables the scientist or press information officer to anticipate the audience's reactions. Noticing that the information does not get through, he or she can adjust the use of language or the level of abstraction. More or different examples can be given, and the audience can be involved more deeply by allowing questions. An excellent example is the lecture, where the lecturer can counter a decrease in the audience's attention by adapting the story, providing extra explanations or asking the audience to give their own opinions or experiences.

Personal contacts with the target group, for instance on open days, also enable the scientist to gather information. By means of this two-way traffic he can trace opinions, examples and the like which prevail in society. Scientific research increasingly involves social and ethical repercussions. Scientific researchers frequently operate within small circles of usually like-minded persons. Direct contacts with the general audience enable such researchers to examine their views and assumptions in the light of what is alive in society today. This, too, is not a novel idea. In 1968 Nauta wrote that "a closed group, convinced of being able to cope with the problems of its own discipline, where it is the sole authority, will eventually face a crisis". He also wrote: "Thanks to the confrontation with those who ask us questions, the real scope of the problem becomes clear, and we realize that through our discipline alone, we are unable to come up with the answer".

Many new roads in science popularization employ several channels; they are multimedia in character. A multimedia approach probably increases the yield in two ways: a large segment of the public gets several stimuli on the same subject, and individuals can select from these stimuli those that appeal most to them. Opinions differ on the results of these combinations of stimuli. Some scientists think that people combine several stimuli, for instance sight, hearing and smell), thus increasing their effects. Others, however, are of the opinion that most

people make a choice from several stimuli, giving prevalence to sight and not paying attention to sounds, smells and the like.

The second aspect appears to be less controversial. For instance, when in a science centre information can be read on signs, seen and heard on video screens and experienced through hands-on arrangements, both visually and practically inclined visitors can benefit best.

Finally: the subject of interaction within the target group. When people, for instance, attend a science theatre together, the effects of this diffusion of scientific information will be strengthened by social interactions. Discussing the subject together can enhance the effect of the transfer of scientific information, and selective perception may be diminished. Changes in behaviour are apparently brought about more easily when people are in a group. And if this group might decide to accept some innovation, individuals will accept this more easily when they have been part of this group. Of course, this mechanism can also work the other way; when opinion leaders in such a group reject or disapprove of information, the result for the whole group could be negatively influenced.

If the advantages are so clear, why does not everybody employ these means liberally? Apart from traditions in science popularization, unawareness of new possibilities and the like, several serious disadvantages are obvious. These are:

- the high costs
- the minor improvement on the status of the person who provides the information, and finally
- the relatively small scope

Open days, science centres, science clubs, science theatres and science weeks are usually expensive. Organizing them generally costs a lot of money, time and manpower. Some organizations, like universities, often cannot afford to organize such activities. Others, like companies, do not want to spend so much money on activities, of which the results may appear to be doubtful. Open days, guided tours, science clubs and the like often draw less attention than an article in a national newspaper or an appearance in a television show. The scientist or information officer who promotes such actions may be less appreciated by his superiors. He can deposit a press release, newspaper article or videotaped tv-broadcast on his superior's desk, but this is difficult to achieve with a guided tour or lecture.

Finally, many scientists and their superiors are obsessed by the wide range offered by national newspapers and television. Even if only a small percentage reads the article or sees the tv-programme, this will still amount to tens or hundreds of thousands of people. A lecture will generally reach only some dozens of people, a science week or open day generally draws a couple of thousand visitors. Although the yield per person of these new roads may be higher, the results visible to the casual observer are smaller.

This plea for new roads in popularizing science is no action against science journalism. Popularizing science through the mass media is a valuable way of keeping part of society informed of what is happening in science. However, the limitations inherent in using mass media make it necessary to supplement this way of disseminating scientific knowledge with new roads.

Literature

(all in Dutch)

Science and Technics for a bigger audience
PWT report. Utrecht, 1990

Haan, A. and Willems, J
A plan for the organization of Public Days
PWT manual. Utrecht, 1989

Hansen, L.
Science in Newspapers
Nijmegen. Utrecht, 1991

Lang, H. de
Science popularization and the Law of Tichenor in: Katus and Wiedenhof
(ed) Science Information.
Amsterdam, 1980

Nauta, Z.
Medicine in a changing world
Medisch contact 1968 (1075-1078)

Stappers, J. cs
Amsterdam, 1990

Vonk, R.

Science in Newspapers
Massacommunicatie 8-1/2 1980

Willems, J. (ed.) Information in another way
Deventer, 1983

Willems, J.
Press releases have little effect Massacommunicatie 18-3 (1990)