The evaluation of science-based organisations' communication programs

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Abstract:

This paper highlights the importance of evaluation of communication activities for science organisations. It also suggests a process for evaluating such activities based on recent case-study examples from the Cooperative Research Centre for Catchment Hydrology and the National Dryland Salinity Program.

The paper outlines a seven-step approach to evaluation:

1. Formulate clear objectives that can be measured
2. Identify communication activities relating to awareness raising, information exchange, dialogue, involvement and adoption
3. Define performance indicators related to communication activities for each objective
4. Ensure collection of any 'base-line' data to provide a benchmark for measuring future performance
5. Choose tools to provide feedback on implementation of communication
6. Choose tools to measure on-going performance
7. Assess performance according to set targets

The proposed evaluation process will be compared with accepted and tested methods used in evaluation of public health campaigns also aimed at attitudinal or behavioural change.

Introduction

Communication of science is often conducted without consideration of how such communication activities meet the objectives or goals of an organisation, or how they can be evaluated to ensure they meet these objectives. This is usually because evaluation of science communication programs is perceived to be a difficult process given that the objectives of many of these programs is to create change in attitudes or behaviour, as associated with "adoption" or "technology transfer" of science outcomes. The measurement of change can be a challenging process, especially if evaluation mechanisms are not built into the communication process from the beginning.

The aim of this paper is to use examples to propose a process for evaluating science communication programs that can be built into any science communication program from the beginning of its inception.

One of the difficulties of assessing science communication programs is that people have different definitions, perception and expectation of what is meant by the word "communication". However, communication can be defined (using the Little Macquarie Dictionary) as "To give to another, impart, transmit; to make known; to have an interchange of thoughts". Embodied in this definition are the concepts of:

- Awareness-raising – "to make known"
- Information exchange – "to give to another, impart; transmit"
- Dialogue – "to have an interchange of thoughts"

These three concepts are often the objectives of science communication programs, and are further directed (especially in regard to natural resource sciences) to creating some sort of change in attitudes or behaviour; what is generally referred to within the science world as "extension", "adoption" or "technology transfer".

An important issue for any science communication program is to determine: "what difference have we made?" and disentangling this from the wider factors influencing community or stakeholder attitudes and behaviour in regard to scientific endeavours. This is no easy process, but it is an important process to undertake. The governments and organisations that fund programs can quite rightly ask: are they working? Our community of science communicators would be well served if the assumptions on which science communication programs sit were tested.

There are two simple reasons for conducting an evaluation:

- To gain direction for improving a project as it is developing
- To determine a project's effectiveness after it has had some time to produce results

However, for those involved in science communication across the world, evaluation of science communication programs is a relatively new process (Gascoigne et al, 2001, In press). Those involved in health campaigns also directed at attitude and behaviour change have a much longer history of evaluation. Eng et al (1999) states seven benefits of evaluation of public health campaigns that are summarised below:

- To improve the quality, utility an effectiveness or campaigns through identification of potential problems and the acquisition of feedback to enhance quality
- To minimise the likelihood of unexpected harmful effects from the application of new technology/applications
- To promote innovation and "time to market"
- To conserve resources through averting investment of resources in ineffective applications
- To encourage the participation of stakeholders in the development and implementation process
- To promote confidence among end-users about making informed choices
- To promote a positive image for the industry and the companies and organisations involved in it

Similar benefits can be expected through evaluation of science communication programs. However, like health campaigns, there are some challenges to overcome before such evaluation can be effective. These can include:

- The perception that evaluation is costly and difficult
- The unwillingness of some science managers to be seen in a potentially negative light
- The complexity of science communication messages (especially in the area of natural resources science)
- The lack of practical tools and approaches to evaluating science communication
- The dynamic nature of science communication, especially with collaborative research programs

A process for evaluation

Principles

Eng et al (1999) proposed some key principles for evaluation of public health campaigns related to Interactive Health Communication Applications. These principles can be adapted to also relate to science communication programs:

- *Evaluation should be practical* – methods chosen should reflect real-world considerations such as availability of resources and skills; the methods should be simple enough for anyone to administer
- *Evaluation should be proactive* – evaluation should be built into the development of the science communication program from the beginning of the program; it should also be on-going throughout the program so that problems can be rectified and activities improved or redirected when needed
- *Evaluation should have a clear purpose* – evaluators need to have a clear vision of how their results will be used to improve their communication efforts and/or develop new science communication programs
- *Evaluation should be a shared responsibility* – communicators, scientists, managers, research partners and stakeholders should all share responsibility for evaluation
- *Evaluation should be ongoing* – evaluation needs to be part of the science communication process through the conceptualisation, design, implementation and re-development of the science communication program (in a similar way that communication needs to be part of a science/research program)

Types of evaluation

Formative evaluation may be used in the early stages of developing a science communication program to assess the nature of the problem and the needs of stakeholders or partners. The focus is on informing and improving program design and ensuring that it meets stakeholder/partner needs. Typical evaluation activities include:

- Stakeholder/partner needs assessment
- Developing and pre-testing communication and evaluation plan
- Developing and pre-testing core messages, as part of the communication plan

These activities may be conducted through methods such as workshops, focus groups, literature search of existing information, surveys, and interviews.

During the developmental and implementation phases of the program, *process* evaluation may be used to monitor the effectiveness of the implementation. This may include activities such as pre-testing specific activities (e.g. draft fact sheets, articles etc) before they are produced and widely distributed. It may also include monitoring of feedback to activities such as workshops, field days etc. There may also be a need to regularly assess the satisfaction of stakeholders or end-users to the overall science communication program. This can be done using the same methods outlined for formative evaluation, and may also include analysis of any feedback or monitoring programs.

Outcome evaluation is used to assess the ability of the science communication program to achieve its objectives, and its ability to produce benefits in relation to costs (i.e., efficiency or cost-effectiveness). This process uses the same tools as for formative and process evaluation, but tends to use more quantitative tools (e.g. surveys, polls, etc) than qualitative tools (e.g. focus groups, interviews etc). Outcome evaluation usually relies on having "base-line" data to measure the change in attitudes or behaviour created by the science communication program.

A model for evaluating science communication programs

A model developed for the evaluation of public health campaigns (especially one developed by the US National Cancer Institute) can be adapted for use in the evaluation of science communication programs, and this model is described in the table below.

Stage in program	**STEPs in building in evaluation**	**Evaluation activity**
Conceptualisation and design of program	1. Setting clear objectives for the communication plan 2. Identifying activities relating to awareness raising, information exchange, dialogue, and adoption (change) 3. Defining performance indicators 4. Establishing base-line data to provide a benchmark for future performance evaluation	*Formative evaluation* • Stakeholder/partner needs analysis • Ensuring objectives are measurable • Pre-testing of plan • Pre-testing of messages *Outcome evaluation* • Establishing base-line data for each performance indicator for later outcome assessment
Dynamic implementation of program	5. Choose tools to provide feedback on implementation of communication activities, and adjust communication plan accordingly 6. Choose tools that link with the performance indicators and measure the ongoing performance of the program	*Process evaluation* • Pre-test key activities • Obtain regular feedback from partners/stakeholders *Outcome evaluation* • Test overall performance against performance indicators regularly throughout program (e.g. every 12 months)
Assessment and review of program	7. Assess performance according to set targets, and revise program plan/develop new plan	*Outcomes evaluation* • Final program assessment against performance indicators

Steps in evaluation

The seven steps outlined in the above table are crucial to successful evaluation and are described more fully below.

1. Set objectives

Evaluation should be built into a program from the start. Objectives of the program should follow the SMART rule - simple, measurable, achievable, realistic, timebound. The difficulty with many science communication programs is that their objectives are anything but SMART. They tend to be CUT - complex, unmeasurable, and lacking timeliness.

2. Identify core communication activities

The key communication activities that back up your objectives need to be determined so that *performance* in these activities areas can be measured and determined. The key communication activities to consider are:

- Awareness raising – e.g. media activities
- Information exchange – e.g. newsletters, use of Internet, workshops
- Dialogue – e.g. workshops, personal meetings
- Adoption – e.g. involvement of partners, trialing of technology, commercialisation

3. Defining performance indicators

Performance indicators are quantitative or qualitative measures of how well a program is achieving set objectives. They are generally also linked to the core communication activities, as indicated with the examples below:

- Awareness – "level of awareness of the program's activities"
- Information exchange – "level of use of program's newsletter"
- Dialogue – "Degree of satisfaction with the interaction between program partners"
- Adoption – "Level of use of program products"

4. Establishing base-line data

For outcome assessment to be successful, it is important to establish base-line data at the start of the communication program to see if there is any change over the life of the program. This may mean determining current attitudes, needs or behaviours at the start of the program through tools such as opinion polls, surveys, interviews or focus groups. For example, if an objective of the program is improve awareness of a new technique for preventing soil erosion, then you will not know if you have been successful unless you measure what the current awareness of this technique is. This step is most often forgotten in developing science communication programs.

5. Choose tools to provide feedback on implementation

It is important that evaluation is not something that is just thought of at the beginning or end of the program. It is also important throughout the life or the implementation phase of a science communication project. This is largely a matter of building in pre-testing, monitoring and tracking mechanisms throughout implementation of the project. For example, before producing an expensive video you might find it useful to pre-test the script of the video with a sample target audience to see if the messages are clear and if the video is achieving its purpose.

6. Choose tools to measure on-going performance

If the science communication program is a long one (e.g. greater than one year), then you should plan to do periodic checks of your progress against the objectives that you originally set. This might occur every 12 months or two years, and should seek to measure performance towards achieving objectives using the performance indicators and comparing with base-line data originally colleted. If your progress is not as quick as you would like or the results of this assessment indicate there could be better ways of achieving your objectives, then your communication plan may need to be modified. Through steps 5 and 6, your communication plan should remain dynamic in achieving the objectives of your plan and ensuring that you meet the changing needs of stakeholders/partners.

7. Assess performance according to set targets

When your program has been completed you need to conduct a final "summative" assessment to see if the outcomes of the program have been successful in achieving its objectives. In some science communication programs where adoption is a long-term process, it may be important to conduct the final assessment some time after the communication program has actually concluded. This final evaluation should compare the final performance with the baseline data originally collected.