The Information Network Center for Activiting Science Journalism and the Regional Cooperation

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Introduction

The influence of science and technology on our lives has boomed, and concern that the average citizen is getting further and further out of touch with the world he lives in has followed this boom. More and more of the decisions the present-day voter and consumer must make involve technologies.

The expansion of science knowledge in the past few decades has been so tremendous that the specialists can barely keep pace with developments in their own fields. Educated laymen often lack training in the appreciation and understanding of science. One of the challenges is to communicate accurately and interestingly so that authentic knowledge will appeal to a wide audience. Accuracy need not mean dullness, although many in the scientific and the journalistic communities equate them.

But communication of science to the general public faces a number of inherent obstacles. For one thing, relations between the press and the scientific community often are strained as the result of defaults or defects on both sides[1]. Editors may misperceive the interests and/or the capabilities of their audiences[2]. Another obstacle is the difficulty of translating scientific terms geared to the general public.

Scientists have criticized mass media sharply for inaccuracies, which are assumed by them to result from sensationalism, from quoting out of context and from media practices that sometimes take editing and display treatment out of the reporter' s hands[3].

What is accuracy? In general, news accuracy is broadly defined as truthful reproduction of an event or activity of public interest[4]. An inaccuracy is a flaw in reproduction. For many elements of a news stroy there is no accessible independent criterion of accuracy, and the investigator turns to the news makers-persons who have been reported. Operationaly defined, an accuracy is a news story error that is noted by a person who is "significantly mentioned" in the stroy. An inaccurate stroy is one that contains at least one such error[5].

Cole charges that by simply covering scores of stories about health risks, the media confuse even the highly educated. For example, says cole, 90-

percent of his undergraduate students in the sociology of the law believe that the use of the Pill is a significant risk to health ; 95percent of the women said they would not use it. None of them had consulted a physician or a scientific journal ; all their information came from the New York Times and from television news reports[6].

Burger goes oven furter in his study of print coverage of various medical risks. By sensationalizing and simplifying risk information, Burger argues, the media portray potential health threats as posing more risk than most doctors and scientists attribute to them[7].

Review of Relevant Research

The trpical accuracy study is an after-the-fact check of how well a science writer has done his job. In the simplest study, the scientist whose ideas are duscussed in an article reads the story and indicates on a check list of errors found in the story. In the more sophisticated studies, these errors are crosstabulated with one or more writing or reporting practices-such as whether the writer showed the scientist the story before publication.

Reserachers have addressed the problem of whether science articles are less accurate than general news articles. Tankard and Ryan, for instance, found 6.2 errors per science story, compared to 0.77 to 1.17 errors which four other researchers had found in general news articles[8]. Only 8.8percent of the science stories were error-free, compared with 40 to 59percent of the general news articles. Pulford replicated the Tankard and Ryan study using a list of eleven possible erors. The results showed 2.16 errors per stroy and 29.4 percent error-free stories. Pulford's results still showed science stories to be less accurate than general stories [9].

Choe has done a study on science news accuracy in the Korean newspapers[10]. The mail questionnaire technique was employed to the measurement of accuracy. The main purpose of the study was to identify the most common kinds of errors and, if possible, their causes. A sample of 120 science articles was clipped from 11 Korean dailies. In the questionnaire mailed with each clipping, the respondent was asked to check which, if any, kinds of errors occurred in the story quoting him, and indicate the kinds of errors.

The results of the study indicate that the mean number of kinds of errors reported by the scientists was 1.51 per story. The number of kinds of errors per story ranged from 0 to 4 of the possible 12. Thirty stories(30%) were reported to contain no errors. The distribution of the number of kinds of errors was as follows : Thirty stories(30%) had no kinds of errors, 50 stories(50%) had 1-2 kinds of errors, 21 stories(21%) had 3-4 kinds of errors. As shown in Table 1 on kinds of errors, "Relevant information about method of study ommitted" was most frequent error type reported by scientists(33 times ; 32.7%) ; Relevant information about results omitted" was reported 27 times(26.7%) ; "Definition of technical terms incorrect or omitted" and "Misleading headline" were reported 19 times(18. 8%) respectively.

Some Implications for Science Communication Accuracy

Although this type of accuracy results is interesting to the science writer, it tells little about how to improve writing or reporting methods. Knowledge of the most common errors, however, can be useful. Tankard and Ryan, and Choe found errors of omission to be most common errors-omission of relevant information on results, methods and inferences. Misleading headlines also represented frequent errors.

Broberg found the same results using a different methodology. She classfied the changes scientists

made in press releases submitted to them for review [11]. Scientists made significantly more additions for inaccurate writers than for accurate writers. The inaccurate writer made more errors in all other categories as the material becomes more difficult to understand and to explain.

Although the Tankard and Ryan, Pulford, Choe, and Broberg results could indicate that scientists want the mass media to cover their results in the same detail as a technical journals, a better interpretation would be that science writers make frequent errors when they do not fully understand a subject. It is possible to write a science stroy in good journalistic form, but still write it inaccurately. Results of these studies support that observation. This observation is also supported by Burkett who asserted that science writer's best tools are knowledge of the subject, ground rules of the profession and initiative[12].

In her study, Broberg had conceptualized the changes made by scientists in science stories as a way of measuring carter's signaled stops[13]. She reasoned that scientists would make changes in articles when something stopped them in the story. Thus Broberg's results can be connected to Heffner' s studies of stopping and accuracy by student news reporters[13]. Heffner found that the more often writers stopped to question information they received from a news source the less frequently readers stopped while reading the same news stroy. Likewise, news sources stopped more often as they read less accurate stories, thus confirming Broberg' s measure of accuracy.

We can infer that the best science writers are those who actively seek information while writing a stroy. They do not routinely write a story whether they understand it or not. They stop to think and to seek further information when there are gaps in the story. Broberg's study suggests that inaccurate science writers may also fail to stop, think and communicate while writing because of educational and training background. Broberg found that the accurate writers, for the most part, have undergraduate degrees in English, journalism or biology, have taken post-graduate biology or journalism courses and have had some newspaper and freelance writing experiences. In contrast, the inaccurate writers were trained in only one area.

A study by Tichenor et al. provides further support for the idea that frequent stopping and active communication by science writers increase communication accuracy[14]. They found that organizational policies of both the organization that employs the scientists and the organization that employs the science writer improve communication accuracy. For example, they found that the more people involved in preparing a story, the more accurate the result. In their study, accuracy was measured by asking members of lay audiences to explain what a science article had said. Scientist discussed in the articles then indicated whether these statements were accurate or not. They found that writers who had written stories above average in accuracy had gotten information from press releases or journal articles rather than from public hearings. Editor assignment and frequent interactions with scientist during or after writing a story may contribute to higher communication accuracy. In other words, the more people who read the stroy, and presumably stopped and corrected poor or unclear writing, the more accurate the final story. Science articles were also more accurate when the organization employing the scientist had a policy stressing the importance of communication with the public. Articles were most accurate when the scientist perceived a rigid policy for reporting research to the public and the scientists had some administrative or teaching duties. Tichenor et al. thus concluded that "factors that point to more specific, purposive, control of public communication in the

science organization contribute to the production of more accurately understood messages when these scientists come into contact with media professionals." [15] The Tichenor et al. study thus suggests that scientists will communicate more accurately if public relations science writers assist them in releasing science information.

As indicated in literature review, communication between scientists and members of the public must flow through several stages of interactions. There may be interactions between scientists and science writers or between science writers, editors, and audiences. How useful that scientific information is to the public and how accurately it is communicated depends to a great extent on how well these actors understand each other and communicate with each other. Therefore, there should be more studies on the communication behaviors and interaction of these actors in the perspective of accurate reporting of science information.

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