Content Analysis: A Technique for Measuring Attitudes Expressed in Environmental Education Literature

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ABSTRACT: Environmental education researchers have done little in the area of public relations material assessment, especially when photographs have been involved. Content analysis is an approach to documentary research involving archive material. The five steps of (1) defining the population, (2) determining the sample, (3) isolating the unit of analysis, (4) encoding the data, and (5) conducting the statistical analysis are necessary in conducting content analysis research. These five steps are discussed with examples of methods and results from a 1986 study of national forest brochures. This study included the written material, graphics of the title panel, as well as photographs. Results indicated that the brochures might identify more people actively engaged in appropriate forest recreation pursuits, depict a larger number of undomesticated animals, benefit from a lower reading level, and use a greater variety of graphic techniques on the title panel.

Every environmental program, center, group, or agency occasionally produces printed public relations documents, such as annual reports, advertising brochures, special event posters, or media releases. What types of attitudes are expressed in this material? What type of image do those attitudes create? Are these attitudes and images consistent with the producer's philosophy? For something as expensive as literature production and dissemination, that the right messages be conveyed in the most comprehensible manner is imperative. What types of people are depicted as participants? In what types of activities are these participants engaged? What subjects and points of view are emphasized? During the past ten years much has been written about program development and evaluation; very little, however, has been done in the area of public relations material assessment. How does one determine what type of image is actually being presented? How does one insure that misperceptions are not being generated by the materials made available?

Content Analysis

Environmental attitudes have primarily been determined by questionnaires, surveys, and interviews—all
obtrusive methods of research. Besides the obvious reactivity, these methods have severe subject and event limitations (Burrus-Bammel and Bammel 1984). An alternative, which can be used either in conjunction with obtrusive methods to cross-validate results or alone, would be an unobtrusive method. Unobtrusive methods include (1) systematic observations, (2) physical traces, and (3) archive research. Archive material is either continuous or episodic.

Content analysis is an approach to documentary research involving archive material, such as journals, television, newspapers, films, books, brochures, or other physical forms of communication. Content analysis is the "systematic counting, assessing, and interpreting of the form and substance of communication" (Manheim, and Rich 1981). A few individuals have used content analysis of written messages to determine attitudes toward animals (More 1977), natural environments like wilderness areas (Fazio 1979), and management proposals (Stankey 1972). An analysis of textbooks for human-environment courses was conducted by Nislien and Schroeder (1983). The trend of changing concepts in American nature writing was tracked by Hurscher (1972); Hoestery and Bowman (1976) looked at the environmental messages of Audubon and the Sierra Club Bulletin. Citation analysis was used by Hart (1981) to identify key characteristics of environmental education, by Frankener (1980) to determine shifts in perspectives on energy, and by Tanner (1984-85) to study the evolution of environmental education. These researchers, however, limited their scope to written messages. Research investigating environmental attitudes through an analysis of photographs and drawings is sparse, even though news items accompanied by a photograph or illustration of some sort have been found to attract more attention from readers than items not accompanied by supporting visuals (Manheim and Rich 1981).

Many people are attracted each year to West Virginia State Parks and Forests in order to view the abundant wildlife. Yet, when a photographic content analysis was conducted on the brochures that represent the state parks and forests, only 1.1 percent contained any wildlife. The two wildlife photographs were of deer and raccoon—hardly representative (Burrus-Bammel, Bammel, Kopitsky, and Angotti 1985). A recent study on national forest brochures found that domesticated animals such as cattle and horses appeared in nearly 50 percent of the photographs containing animals (Burrus-Bammel, Bammel, and Kopitsky 1987). Content analysis is a useful and easy-to-use method for literature analysis.

Methods

Five steps are necessary in conducting content analysis research: (1) defining the population to be studied, (2) determining the sample, (3) isolating the unit of analysis, (4) undertaking the substantive or structural content analysis (encoding the data), and (5) conducting the statistical analysis. These steps will be explained using as an example a recently completed study that was funded by the United States Forest Service. The Office of Information was interested in determining the attitudes and images that were contained in national forest brochures.

Defining the population. In this case, defining the population—national forest brochures—was easy because it was dictated by the funding agency. In another study, however, the population may not be so obvious. Perhaps the research problem is to determine the image associated with a specific organization, such as The Wilderness Society, or with a local nature center. The population selected might be a local newspaper, but it could also be annual reports produced by The Wilderness Society or the local nature center. The population could also be films on public relations material. Any form of archive material could be used. Even visitor comments in registration books and letters received are sources of archive material that should not be overlooked.

Determining the sample. There are 115 Forest Service administration units located on the United States mainland; they oversee 155 national forests. On May 4, 1986, each of those units was mailed a one-page letter requesting brochures. In this case, the total population of 115 units was used because the number was manageable. If, however, the population was too large, a sample would have to be determined. Suppose that a local newspaper was the population for a study about a local nature center called Horseshoe Bend. The sample in this case might be the data from every fifth day during the past year.

Isolating the unit of analysis. Several units of analysis were selected for the national forest brochure study. One of the units was photographs. A tally sheet of forty-seven categories had been developed over several projects (Barlett et al. 1986; Burrus-Bammel, Bammel, and Angotti 1985; Burrus-Bammel, Bammel, Kopitsky, and Angotti 1985) to record the content of each photograph under major subdivision of type of environment (natural, natural modified, and artificial), people (gender, age, group composition, dominant and recessive, minority, handicapped, etc.), activities (swimming, hiking, camping, etc.), animals/wildlife, and picture clarity.

Because written material was also considered important, eight categories of syntactical units of analysis were identified: (1) references to people (i.e., nonexist or sexist language), (2) publication dates, (3) the non-discriminatory clause, (3) the multiple-use philosophy, (4) the readability level, (5) motivations for visiting, (6) activities mentioned, and (7) subject matter of subtitles.
Most content analysis studies have been far less ambitious than the above; in fact, many have used only one unit of analysis, such as titles of courses offered over the years in environmental studies programs. A study of any national organization could analyze the titles in the journal that is produced by that organization to determine how the focus has changed over time. A wildlife journal could be analyzed in terms of proportion of articles devoted to game vs. non-game species.

Undertaking the content analysis. This part of the study involves (1) establishing the categories and determining the methods that will allow encoding the data and then (2) encoding the data. Once the categories are established, a tally or other forms of measurement can be completed. For example, in the national forest brochure study a method for measuring the reading level had to be selected. A software program called Readability Calculation (Micro Power & Light Company, Dallas, Texas) was selected to determine Gunning's Fog Index (Gunning 1968), which corresponds to the established reading levels for school grades. Three samples of 100 words or more from three different locations (introduction, middle, and end of narrative) in each brochure were used in determining reading level. Sections of the text that were composed of rules and regulations or directions, as opposed to descriptive narratives, were not used in the sampling process.

One section of the photograph analysis focused on activities in which visitors were shown participating. The check or tally sheet contained the following:

1. Boating
2. Swimming
3. Biking
4. Walking/hiking
5. Fishing
6. Play activity
7. Sitting
8. Eating
9. Horseback riding
10. Other—specify

For each picture, the encoder could check any box that might apply. The categories would probably be much different in a study of the local nature center materials such as annual reports or brochures. Some items might deal with program content, such as bird identification lab work, nature walk, and planting trees.

Conducting the statistical analysis. There are those who fear research and do not get involved in any projects because of the statistical aspects. Part of the beauty of content analysis is that much of the statistical analysis can be limited to calculating percentages. One can go a step further to determine if the findings of the content analysis are significantly different from what was expected or exists in the real world. For example, is there a significant difference between the percentage of female writers and the percentage of women members of The Wilderness Society if 25 percent of the articles were written by women, whereas 55 percent of the membership is comprised of women? The same type of analysis can be done to determine if the differences from one year to another are significantly different.

Results and Implications
Twenty-four delivery days after the May 4 mailing, 95 percent of the 115 Forest Service administrative units had responded and the response rate was 100 percent by July 1, 1986. In all, 1,294 documents were sent, and among the documents were ninety-one brochures that represented either a national forest (N = 22) such as the Chippewa or a major attraction in a national forest (N = 69) like Mount Shasta. These ninety-one brochures served as the population for the content analysis. The following results, which will serve as (1) examples of what can be learned from content analysis, and (2) points for discussion, are based upon that population.

Photographs
The ninety-one brochures contained a total of 376 photographs. The three methods that can be used to check environmental emphasis are frequency, total space, and average size of photograph in each category. Frequency by itself is not enough; it ought to be supported by at least one of the other two measurements. Natural environments, those photographic scenes with or without people that contained neither artificial structures nor evidence of environmental modification, such as trails or developed camp sites, occupied 55 percent of the 45,856 square inches of photographs and over 50 percent of the frequency tally. Less than 11 percent of the space was devoted to artificial environments. Frequency, total square inch area, and average photograph size for the three environmental categories were as shown in Table 1. Obviously, other environmental categories, such as water, desert, or prairie, could be developed. There should be some reason why photographs are selected for inclusion, and content analysis can be used to make sure that the desired emphasis is actually present in the developed material. It would seem odd if the natural environmental category were not the emphasized one in a brochure developed for a wilderness area.

If an area is open year round to the public, then it follows that material from those areas should reflect that availability, yet only 24, or 6 percent, of the photographs reflected seasonal variation (snow, fall leaf coloration, bare branches) from spring/summer.

Photographs containing people. People were depicted in 195 (52 percent) of the photographs. Every agency designing brochures in which people are depicted needs to determine how best numerically to represent special inter-
TABLE 1.—Content Analysis of Photographs

<table>
<thead>
<tr>
<th>Environmental category</th>
<th>Frequency</th>
<th>Total area</th>
<th>Average size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural</td>
<td>203</td>
<td>2,542.30</td>
<td>12.13</td>
</tr>
<tr>
<td>Natural modified</td>
<td>137</td>
<td>1,559.38</td>
<td>11.24</td>
</tr>
<tr>
<td>Artificial</td>
<td>36</td>
<td>485.03</td>
<td>9.54</td>
</tr>
</tbody>
</table>

est groups, such as minorities, the handicapped, women, and the elderly. Only two photographs, or 1 percent of those photographs depicting people, contained an individual who could be classified as a member of a minority group. Six percent, or 9 photographs, showed an individual who could be considered handicapped. Of those 9 photographs, 7 were located in one brochure of an area especially designed for the handicapped. Men appeared in 26 percent more of the people photographs than did women (Figure 1). Males appeared almost twice as often as females, the elderly appeared in 15 or 7.7 percent, and Forest Service personnel were found in four photographs. Only one minority individual and no handicapped individuals were depicted in the twenty-two brochures in the national forest subgroup.

A question to raise is whether brochures should reflect current use data or population statistics. The answer to such a question would certainly affect the brochures’ text as well as their photographs. If 11 percent of the population is classified as elderly, should 11 percent of the photographs be of the elderly? There are statistically more women than men, but more men have participated in certain outdoor activities. Public and private agencies will probably view this situation differently because their philosophies and motives vary. Private agencies may produce brochures oriented to the group from which they can make the greatest profit, while a public agency may feel obligated to be more representative.

People were part of the subject matter of 195 photographs, 121 or 62 percent of which showed them actively engaged, while the remaining 81, or 41 percent, pictured them passively engaged. People depicted in photographs classified as engaged in passive pursuits were either standing or sitting, rather than participating in activities such as swimming or hiking, which require a certain amount of energy expenditure. The Forest Service 1985 (1986) fiscal report cited the following as the most frequently occurring activities in national forests: camping, mechanized

![Figure 1.—Comparative Frequencies and Percentages of Females and Males Found in the Photographs of the Combined Group of National Forest and Major Attraction Brochures, 1986.](image)
travel, winter sports, fishing, hunting, water sports, hiking, mountain climbing, and picnicking. The five most frequently occurring activities in the brochure photographs were walking or hiking, fishing, sitting, playing (unstructured, unorganized activity that involves motion) and boating (power driven, not canoeing). The top five activities varied when male and female subgroups were compared. Fewer than 9 percent of the fishing and boating pictures contained females. Activities most frequently mentioned in the brochures’ text were camping (69), walking or hiking (60), fishing (54), picnicking (38), swimming (36), boating (32), horseback riding (16), backpacking (12), and nature study (12). Both photographs and written material should combine to reflect the philosophy, objectives, or goals the agency or group represents or wants to represent. Therefore, the selection of brochure material and the manner of presentation is very important and should follow some strategy. For example, the content of photographs and written material could reflect current user patterns, the desired user pattern, or possible user patterns.

Photographs containing animals. Wildlife is a visitor attraction. Illustrated according to frequency (number of photographs containing a given type of animal, not the number of animals found) the brochures were the following animals: horse (12), cattle (5), deer (5), bird (3), dog (3), moose (2), fish (2), mule (1), and turtle (1). Domesticated animals were more numerous (57 percent) than undomesticated animals. Once again, the question is: what should be presented? If an area contains animals like deer and moose, obviously less common everyday sights to the majority of potential users, why not capitalize upon the resource? Lime and Cushwa (1969) reported that 96 percent of all campers interviewed indicated that the opportunity to see wildlife in its natural setting added to their outdoor experience.

Syntactical Units of Analysis. According to Gunning (1968), the fog score helps to determine the level of reading difficulty for any piece of text to which it is applied. The reading level of public relations material should correspond to the intended audience. A fog score range from 6 to 10 indicates an easy reading level. The average score for the national forest brochures was 11.93, the range extended from 8.14 to 16.14, and the most frequent level found was that of high school sophomore. Material with a fog index that is higher than the intended audience ought to be revised before printing or before reprinting.

Subheading themes. Every group producing public relations material needs to examine its use of space in order to achieve the most accurate and positive image possible. One aspect of the image conveyed by the Forest Service is a great concern for the health and safety of the visitors. Over 20 percent of the 365 subheadings were on health and safety. The five most frequently occurring subheading themes were health and safety (92), attractions (80), general information (66), activities (64), and natural and historical (63).

Title panel summaries. The title panel of a brochure or the cover of a report is important because it can set the tone for the entire document. It can decide whether the reader will continue. In general, the Forest Service title panels could be classified as being graphically conservative. An analysis of title positions on the front panel revealed that 90 percent of the titles were either centered (44 percent), left justified (25 percent), or right justified (17 percent). Only 10 of the 91 brochures had some other title placement, such as an arched (1 percent), diagonal (1 percent), vertical (1 percent), staggered (5 percent), or combination of alignments (2 percent). Ninety percent of the lettering was a block style, 1 percent was script, and the others were a combination of the two. Greater use could have been made of graphic elements such as angle, size, and contrast. Diagonals impart greater action, but very few titles or photographs were placed off the horizontal line. The front panel was always the same shape as the following panels, and no cutouts (windows) were used. Little, if any, use of drawings occurred. Over one third (38 percent) of all lettering on the title panel was in black. Twelve brochures did display shadowed or outlined letters, but all the others (87 percent) were solid.

Summary

Public relations material should reflect the agency’s philosophy and purposes, and if content analysis provides results that indicate conflicts or misperceptions, the material should be revised for the next printing.

When selecting photographs, thought must be given to the type of environment and the season depicted, as well as to allocation of pictures containing people. Managers of a wilderness area might want to stress people-free pictures or isolated backpackers. A brochure about an interpretation center should contain some photographs of the activities, facilities, and services offered to visitors. Once it is decided to include pictures of visitors, the race, gender, age, behavior pattern, and activity shown must be determined. Photographs of people could reflect current user data, demographics, or desired user patterns.

This study involved content analysis of Forest Service brochures produced for the national forest system. But the methods and techniques employed could have utilized any type of archive material and could have been used to analyze any type of content or topic. Resulting data can be used in a number of ways. It can be used to test generated hypotheses, to give a collective impression, to compare separate pieces, or to provide, as in this case, descriptive information. Descriptive information can first be used to decide if the content is actually what was intended and then to formulate recommended changes for altered public relations material.

Given the cost of printed material and the importance of public relations, content analysis should be performed.
periodically to insure that materials represent current programs and that the people and animals depicted are in some way representative. From this particular study, it is apparent that Forest Service brochures might (1) picture more women, minorities, and elderly people; (2) identify more people actively pursuing appropriate forest recreation pursuits; (3) depict a larger number of undomesticated animals; (4) benefit from a lower reading level; and (5) use a greater variety of graphic techniques on the title panel.

REFERENCES


