

The Role of Interest in Environmental Information: A New Agenda

Martha C. Monroe
and

Raymond DeYoung

*School of Natural Resources and Environment
University of Michigan, USA*

The majority of environmental information is presented in factual, expository text format. Although this form of text may be sufficient when learner interest is already high or when incentives are strong, environmental communicators cannot always rely on traditional text to provide citizens or students with environmental information that is comprehensible and motivating. The literature suggests that the qualities of written material that make it more interesting, particularly those qualities found in stories, could make text more meaningful and memorable to readers. This twist on written material could open significant opportunities for research and new presentation techniques for written text.

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INTRODUCTION

Science textbooks, like other texts and magazines, compete in an information-rich world for students' finite attention. Bright pictures, bold titles, career information, and a liberal sprinkling of the word 'you' help textbooks appear readable and intriguing. Beyond the relevant and catchy introduction, however, most chapters sink into the familiar, traditional approach to text. This expository explanation of a generic concept has little imagery or suspense. In this format, most readers find the information more difficult to read and remember. Like an encyclopedia, the text is rather boring and dull. Most readers would not attend to the text, unless compelled by the need to know or the threat of a quiz. Despite the hurdles this style of writing presents, it tends to be the preferred method for communicating factual scientific information.

There is a type of text, however, that itself attracts and holds the attention of the reader. Interesting text is most often fictitious narrative – a nail-biting

mystery, a historical novel, a timeless myth. This apparent distinction between interesting, fictitious narrative and boring, factual, exposition has created a peculiar dilemma (Kearney, 1993; Rosen, 1985). Are readers likely to assume that anything interesting is fictitious? Do readers use cues such as interest-producing characteristics to alter the way they value or process information? A few non-fiction authors, such as McPhee (1971) and Reisner (1986) and creative journalists are testing this barrier by writing true stories about environmental heroes, western water supply, and current events with qualities of text-based interest. They have given us a way of understanding the possibilities of combining these two traditions.

What makes text interesting is the foundational question of this article. The next, logical question is whether these characteristics improve the interest of factual, environmental text so that it becomes more understandable and more memorable for more readers. Using the literature, the theories, and empirical research, a case for further research will be made. Several examples of interesting environmental text will be used in an effort to illustrate the possibilities this hybridization of text types might bring. Although much of the literature

Correspondence may be addressed to: Martha C. Monroe, School of Natural Resources and Environment, University of Michigan, Ann Arbor, MI 48109-1115 USA.

is found in the field of educational psychology, environmental educators may find a new application for these findings: creating and using interesting text to increase the reader's knowledge and care for the environment.

INTEREST

Unfortunately, the term 'interest' has many meanings. It often refers to the topic; the reader's interest in a topic makes written material about that topic interesting. The **topic-based** interest works for those with a predisposition to spaceships or horses, for example, which usually implies a prior knowledge of these subjects, and for universally appealing content such as danger and sex (Schank, 1979).

Interest may also arise from the way the text is written. **Text-based** interest is created by authors who use qualities such as action, mystery, imagery, and meaningful characters. These characteristics are also described as creating 'interestingness'.

When readers are asked 'is this interesting?' it may not be possible to know if their answers mean they are interested or the material is interesting. And, although this is the distinction between topic- and text-based interest, it is not a distinction most people recognize. They are clearly, however, two different dimensions, as the reader of a dull passage about a favorite topic might reveal. Both forms of interest pull readers into the material and capture their attention (Hidi & Baird, 1986). Qualitative studies that probe the subjects' responses, studies with careful controls of variables that may create interest, and studies that look at the value of interest however it is generated, may be appropriate avenues for furthering our understanding of interest.

WHAT DOES INTEREST MEAN?

Writers motivate readers by breathing life or voice into words (Elbow, 1981). All the reader knows, however, is that interesting text is easier to read. This ease is, in part, due to the mechanism that engages their attention. Attention is the means by which we are able to focus on selected stimuli, such as the meaning or flow of the text, allowing for the information to be perceived and processed. James (1892)

described the two types of attention. They are called *involuntary attention* and *directed attention*.

Involuntary attention is spontaneous and effortless. It attracts us to things that could be dangerous (e.g. wild animals, blood, loud noises, guns, snakes, movement) and also to things that could improve our survival (e.g. trees, caves, running water, food, sex). Learned involuntary attention accounts for those things that capture an individual's attention based on his or her prior experience, such as one's name or new information about one's hobbies. Universally interesting themes (family feuds, cheating, and underdog-turned-hero) as well as elements of story construction (mystery and suspense) typically employ involuntary attention. Involuntary attention is so powerful that it can inhibit competing information and ideas. Such is the case when Roger Tory Peterson, one of America's foremost ornithologists, became known for his dangerous ability to pay more attention to the roadside birds than the car he was driving! He eventually gave up his driver's license. Topic-based interest is thought to engage and hold a reader by drawing on involuntary attention. A study by Schank (1979) confirms that certain topics, such as life and death situations, danger, and unexpected events are associated with high interest.

Directed attention is used to deal with the many events and activities throughout the day that are important but intrinsically uninteresting (Cimprich, 1990). Directed attention allows one to engage in purposeful behavior and thought. Mental effort is required to sustain directed attention, however. It is not spontaneous nor effortless and is easily fatigued (Kaplan & Kaplan, 1982). Because of the energy required to sustain directed attention, text that necessitates it becomes burdensome to read; our mind is more likely to wander.

WHAT MAKES TEXT INTERESTING?

It is clear that **topic interest** plays a strong role in attracting readers to written material (Asher, 1980; Matthews, 1988; Schiefele, 1990; Williams, 1983). Some research predicts what topics students will be interested in by age, sex, scholastic ability, or race (Bank, 1986; Downen, 1971). Other efforts confirm that being interested in a topic indeed increases comprehension, interest in reading more

about this topic, and to a limited extent, recall (Asher, 1980; Cecil, 1984; Estes & Vaughan, 1973; Williams, 1983).

These researchers point out that if the reader's interest is due to prior knowledge of the topic, this prior knowledge may account for the reader's increased comprehension or recall scores. Studies have shown, however, that topic interest and prior knowledge appear to contribute independently to increased comprehension (Baldwin et al., 1985; Bewley, 1988; Entin & Klare, 1985; Roberts, 1987; Sacks, 1990). In some of these studies, students read encyclopedia passages, ensuring that interest was solely a function of the topic, not text-based variables.

For environmental subjects that are inherently interesting (e.g. endangered tigers), topic interest may be sufficient for engaging readers in text. But environmental educators must make less thrilling topics interesting and engaging. Rubbish, for example, can be a rather disgusting topic but it has become a popular theme because, in part, recycling is an achievable solution. Text about rubbish can be personalized in a variety of ways. For example:

It's a startling thought, to say the least - luxury yachts, with names like Siesta Time, Sweet Sue, and Flying Saucer, moored along-side 64,000 plastic milk jugs, pulled out of Naperville's garbage a few months back. Not that the garbage looks like garbage . . . It has been changed into lumber: tongue-and-groove-style boards form the impressive new deck on the Southern Shore Yacht Club's reconditioned dock.

Visitors to the dock are told about the milk jug connection to show them what can happen to the nation's garbage when it gets into the right hands.
(Tonge, 1988)

It is clear that there is more to generating interest than the topic. The following review will summarize some of the studies that have tried to identify the components of interesting text.

Since there is not a single variable (other than, of course, reader opinion) that measures interest, the research has tended to rely on the outcomes of interest, most often recall, as an indicator of interest. For example, Anderson et al. (1987) compared recall scores on individual sentences and reported that interest accounted for a mean of thirty times as

much variance in recall as readability, the criterion typically used to grade appropriate levels of reading material. Examples of high and low interest sentences follow.

*The huge gorilla smashed the schoolbus with his fist.
The busy waitress poured the coffee into the cup.*

Anderson et al. (1987) hypothesized that four qualities would contribute to sentence interest: character identification (similarity to the reader), novelty (extraordinary elements), theme (universally fascinating topics), and activity level (intense action or feeling). Sentences were written to include only one factor and rated for interest by third graders. For example, the first pair of sentences below differ in novelty; the second in activity level.

*The policeman shot the criminal with a gun.
The policeman ran over the criminal with a bulldozer.
The student went to the library for some books.
The good student ran to the library for some books.*

Only novelty and theme accounted for a significant amount of the variance in interest. Contrary to expectation, students had a slight preference for sentences with adult characters, not those their own age.

Exploring these four qualities in non-fiction text, Hidi & Baird (1988) modified a text passage on inventors from an elementary textbook to create three versions, all with various mechanisms to improve interest. They measured immediate and long-term (one week) recall with their fourth and sixth grade readers. (Recall is a measure of the number of sentences the reader can reconstruct that are similar to the original text.) In the basic passage, **character identification** was enhanced by adding sentences about the inventors as youths with **image-rich action** verbs. The second version (elaboration) added sentences that elaborated the main theme with **numerical facts or descriptions**. The third (resolution) added to the second passage a **question** that the text later resolved. *How did Edison make a better light bulb?* was followed by an explanation of Edison's unique contribution to the invention.

Readers found both the second (elaboration) and third (resolution) passages most interesting, but surprisingly, this did not translate into improved recall for both texts. The basic and elaboration passages were better recalled than the resolution

version. All revised versions were better recalled than the traditional text, even though they were not equally interesting. A content analysis of the sentences that students recalled indicated that the interest-producing strategies were successful. Sentences that dealt with active, personally involving experiences of the inventors were better recalled. Elaborations with concrete detail were also recalled. The change from *Thomas Edison became the most famous inventor of all time even though he left school when he was very young* to *Thomas Edison became the most famous inventor of all time even though he left school when he was only six years old* increased immediate recall from 57 to 87 percent. More abstract sentences about the general characteristics of inventors and inventions were poorly recalled (Hidi & Baird, 1988).

One of Anderson et al.'s (1987) qualities of interestingness is **character identification**. They concluded that young readers found adult characters more interesting than similar-aged characters. Others have explored the power of character as well. Jose & Brewer (1984) suggested that identification with the story character is an element of story liking, but that character age did not contribute to this identification while gender and 'goodness' of the character did. In another study, personalizing the main character only by changing the name to one familiar to the readers increased reading comprehension for poor readers (Bracken, 1980). Overall, this suggests that 'similarity' to the character may be communicated in a variety of ways that allow the reader to identify with the character to some degree, at least with young readers.

The complex constructs of **uncertainty or mystery** have been explored in a number of studies. Unexpected elements in the story generated more interest (Brewer, 1983; Jose & Brewer, 1990; van Dijk & Kintsch, 1983) and suspense was a factor Jose & Brewer (1984) identified in a model of story liking. According to Iran-Nejad (1987) the degree to which uncertainty contributes to interest may be tempered by the story's outcome. In that study, unresolved story endings were not interesting. Jose & Brewer (1984) would concur; they found that dislike for the outcome affected overall story liking.

The **story's structure** or how the story moves from a problem statement through complications to a resolution (Bower, 1982; Mandler & Johnson, 1977) may also help retain the reader's interest

in the text. As goal importance and the difficulties the character experiences increase, so do both story liking and story interestingness (Jose, 1984). In these cases, what is interesting in the story (the complications) is also what is important (how to overcome similar difficulties). Hidi et al. (1982) point out that in this case, interestingness assists readers in their recall of important elements from the text. In typical expository textbooks, however, interesting elements are often added as an aside and can overshadow the important points to such a degree that readers can miss them (Hidi et al., 1982). For expository materials to model the story format, then, the entire passage should become a story rather than interspersing irrelevant tidbits between informative paragraphs. Armbruster & Anderson (1983) analyzed several fifth grade social studies textbooks and found the important points often neglected, while irrelevant detail was presented in an interesting manner. With regard to the building of the transcontinental railroad, none of the texts made clear why the railroad was important to the country or how this goal was achieved; instead they all mention that Governor Stanford missed the golden spike on his first attempt to connect the final section (Anderson et al., 1987).

The initial example of plastic lumber used several elements of interestingness to attract the reader. Mystery and novelty were woven into the first paragraph with the unorthodox comparison of luxury yachts and Naperville's rubbish. An assumption is made that the reader understands the growing problem of municipal waste; the text builds on that inherent problem with the promise of a solution – plastic lumber. By delaying the 'answer', the text allows uncertainty to propel the reader's curiosity about how this situation arose and how this success might be duplicated. Concrete detail (*Siesta Time*; 64 000 milk jugs, tongue-and-groove-style boards) and vivid, action-oriented words (startling, moored, reconditioned dock) build imagery that help the reader 'see' the text in their mind.

In summary, each of the following elements, above and beyond the role of theme or topic, may have a role in producing interest.

1. Character identification – the degree to which the reader is like or wants to be like the character.
2. Story line – a coherent explanation of the

problem to solution pathway.

3. Uncertainty and mystery – the pull of curiosity to want to read and discover more.

4. Vivid or action-rich imagery – the use of adjectives that better enable the reader to ‘see’ the text and the use of more lively and forceful verbs.

5. Numerical or concrete detail – the use of more specific and quantifiable terms.

EXAMPLES OF INTERESTING ENVIRONMENTAL STORIES

Examples of interestingness are not hard to come by. Perusing articles in the Metro section of a city newspaper often turns up true stories that use various techniques to produce interest. The following examples (like the earlier one about plastic lumber) were taken from newspaper and newsletter articles. In each, a coherent story line is introduced in the first paragraph when the solution to a significant problem is presented. Also in each case, a specific situation, person, or organization is featured to illustrate the point. This provides an opportunity for character identification as well as concrete and vivid imagery about this particular scenario. Several use novelty to increase interest. Clearly, the brief examples provided below do not allow for the interestingness variables such as story line or uncertainty to be illustrated. They do, however, indicate that factual, yet interesting narratives are possible avenues for conveying information.

Character identification, plus theme and activity are variables this author built into this story of commuter bicycling in California:

In this car-crazy state, Ellen Fletcher's boast is at least eccentric and perhaps bizarre. She only fills the gas tank of her battered 1963 Plymouth Valiant twice a year and has to remind herself to take the car out of the garage once in a while for some exercise. Instead, at 60 years of age, Fletcher bicycles.

For excursions to San Francisco, 35 miles to the north, she takes the train and brings her folding bike. For meetings in San Jose, 15 miles to the south, she rides her 18-speed touring bicycle along the roadside bike path, making the trip in 80 minutes. The grocery store is easy. She tethers her three-speed to one of the racks that are plentiful here, then fills up her wire baskets.

Getting home with a load of groceries isn't hard, because the green lights are timed to allow bicycles to get across busy intersections.

(Gross, 1989)

The same characteristics are evident in other stories as well, with different themes.

Dagmar Werner carefully pushes the sand away from the small, round eggs buried in the styrofoam cooler as she inspects them. 'If the mother layed these eggs in the wild,' she explains, 'only a few would ever hatch. With this artificial nest, we can hatch nearly 95 percent of her eggs.'

Werner's efforts to increase the birth rate of iguanas have achieved remarkable success in a very short time. Thanks to her work, scientists are thinking seriously about lizard ranching as a practical way to help save the rainforest in Costa Rica and other Central American countries.

(Gruson, 1989)

And some of the stories use young people as the character, in case character identification requires age identification.

They know which products come in recyclable packages. They've eliminated styrofoam from their school lunches. They've even been congratulated by their governor for their environmentally sound efforts. And they are in the fifth grade!

Meet the kids of KAP (Kids Against Pollution). KAP is a group of youngsters who will not settle for an unclean world; nor do they believe that kids cannot make a difference.

(Forist, 1988)

In each case, an expository text that conveyed the same information would be strikingly different. Characterless and without specificity, such text would generically describe the problem and list the types of solutions possible. For example,

The heavy use of automobiles has become a concern, particularly in heavily populated areas of the country. Air pollution, fuel shortages, limited parking space, and road congestion are increasing problems. Using bicycles for short errands and combinations of public transportation should be considered by everyone.

WHAT VALUE IS INTERESTINGNESS?

Interest and interestingness have attracted the attention of the research community because of their link to improved recall and comprehension. Comprehension scores tend to be higher for material that readers find interesting than for uninteresting text (Asher, 1980; Cecil, 1984; Estes & Vaughan, 1973; Sacks, 1990). While this alone is a valuable contribution, environmental educators have been drawn to the promise of interesting text from teachers' observations that the use of case studies and examples improves students' abilities in environmental problem solving (Monroe & Kaplan, 1988). Indeed, one could imagine that many of the variables that are associated with responsible environmental behaviour, for example, environmental sensitivity, in-depth knowledge of issues, procedural knowledge of solutions, personal investment, social norm, social commitment, personal commitment, etc. (De Young, 1993; Hungerford & Volk, 1990) might be influenced by engaging, interesting text.

Most of the studies in interest, however, measure the value of interesting text by using recall as the dependent variable. Immediately after reading the material or one week later (delayed recall), students are asked to reconstruct the text in writing. The score is the number of the student's sentences that judges can identify in the original text. This measure may favor certain forms of interestingness (particularly sentences with graphic descriptions or unusual data) while obscuring other values of interesting material – comprehension of the entire message. Certainly from the environmental communicator's point of view, the goal is to write text that enables the reader to build an understanding of the concept in a useful and meaningful context and be able to use that understanding in a new and novel situation. Comprehension may be a better dependent variable than recall to address other values of interestingness.

Traditional measures for comprehension, however, may not be adequate for capturing understanding. Standardized tests, independently written multiple choice items, and the cloze procedure (removing every fifth word and asking students to complete the unfamiliar text) have been used in studies on interest and may be better suited to measuring test-taking ability than comprehension.

Interest-producing text is likely to have an effect on

attitudes about the topic or character and willingness to read more, but this literature review discovered no studies that measured resulting attitude changes, other than 'story liking' (Jose, 1984; Jose & Brewer, 1984). Particularly in environmental education, where the goal is specifically to enhance and support learners' attitudes about the environment and their ability to engage in problem solving activities, it is important to address this potential contribution of interesting text.

Another dimension of interest that is worth exploring is to understand why it is helpful in building comprehension. One hypothesis is that a powerful characteristic of a story is the ability to engage the reader (Bardwell, 1991). This engagement may be measured as interest, attention, motivation, concern, or any number of affective states. It allows the reader to construct a useful understanding of the information. It means the reader is involved with the text in a cognitive sense and it may invoke the readers' thoughts in such a way that he or she explores ideas and implications beyond that presented in the text.

Other studies have attributed learning to cognitive involvement, citing the depth of involvement as a determinant in how information is processed and whether that knowledge can later be remembered or transferred to new problems (Lepper & Malone, 1987). Stories not only involve a reader but also supply an example of the context, the fabric, or the circumstances under which this information is useful. The context might assist readers in remembering important concepts from the story text. A specific story, then, would enable readers to build or continue to build a mental model of information that is far easier to recall and to apply to a new situation (because it involves context, story line, relevant details, etc.) than would be the general information supplied by textbooks. Although the learner builds a generic cognitive map in his or her head over time (i.e. an understanding of the information presented in the text), learners do not easily construct that map from reading generic text (Kaplan & Kaplan, 1982).

Furthermore, generic knowledge is constructed by the owner and only built over time from exposure to specific instances (Medin & Smith, 1984). The issue then becomes how to engage the reader to the extent that they will continue to read through an entire series of examples. Research seems to suggest this will be more likely to occur when each example is interesting.

SUMMARY

The American scientific culture seems to have such a deep-seated bias in favor of factual information being presented in a rather dry, plotless exposition that many readers assume that a 'story' must begin with 'Once upon a time'. They may also assume that interesting, lively, character-filled narrative could not adequately convey facts and other useful information.

But there may be a deep attraction to narrative text that is interesting – with a story line, with characters, with vivid descriptions, or with uncertainty about the outcome. The literature suggests that these qualities of text produce a form of interest that is separate from the reader's initial interest in the topic. And the literature suggests that when these variables are woven into the construction of narrative such that interesting, factual, and true stories convey important concepts, readers recall and comprehend the information better than when it is prescribed as expository text.

Interesting narrative can be used to convey information about the environment is a researchable question. So too are the many questions that arise from considering which interestingness variables are most powerful in what circumstances and with which audiences. Finally, the degree to which attitudes can be shaped or supported by interesting text is also researchable.

This article suggests that there may be new and relatively untapped avenues for reaching young people with written text. It should be possible to construct that text in such a way to enhance their knowledge and concern about the environment. While the research is continuing to explore the details, it is clear that text can be made more interesting. And interestingness, rather than having a trivial effect, can directly affect issues important to the field of education. The minds of young people can be engaged, excited, and involved, all while learning useful, relevant information.

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