

## Teaching for Critical Thinking and Decision-Making Writing

Carl Zulauf and Charles Meier

### Abstract

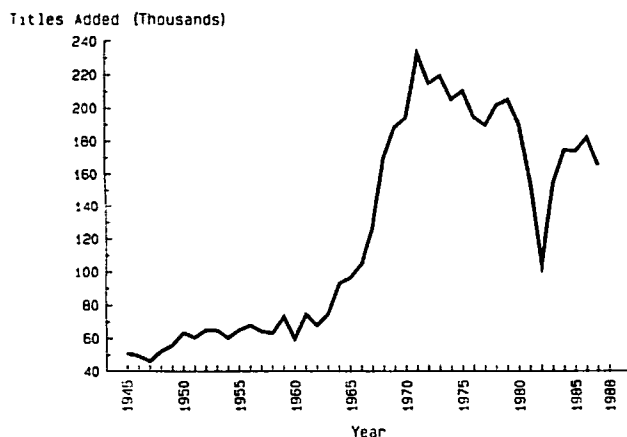
*Explosions in both information and the number of issues to be addressed have increased the demand for individuals who can quickly and critically process information and then effectively communicate the importance of any findings. To facilitate this process, a new style of communication, decision-making writing, has emerged. It is a one-page presentation of all relevant facts and observations needed to understand an issue and options which a decision-maker confronts. This article will show how decision-making writing can be taught effectively. Dependence of this writing style on critical thinking skills and advantages for instructors teaching it are noted.*

The information explosion, illustrated in Figure 1, is a signature characteristic of the 20th century. A second, though less publicized, characteristic of the 20th century is the increase in the number of issues that decision-makers must confront at all levels of both the public and private sectors. The annual number of pages printed in the Federal Register (Figure 2) provides a rough guide to this characteristic.

The combination of explosions in both information and issues has increased the demand for individuals who possess the skills to quickly and critically process information and then effectively communicate the importance of any findings to superiors, subordinates, and co-workers. To facilitate this process a new style of written communication, decision-making writing, has emerged. Decision-making writing is

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Figure 1. Acquisition of Titles by the Library of Congress, U.S., 1945-1988.



designed to reduce substantially the amount of time that busy decision-makers must devote to any one problem by (a) concisely presenting the information relevant to a problem, (b) arranging the presentation logically to show why the information is important, and (c) building upon the information and logical presentation to draw conclusions and/or make recommendations. We were initially exposed to this style of writing on Capitol Hill in Washington, D.C., where it is used extensively to help members of the U.S. Congress cope with demands on their time.

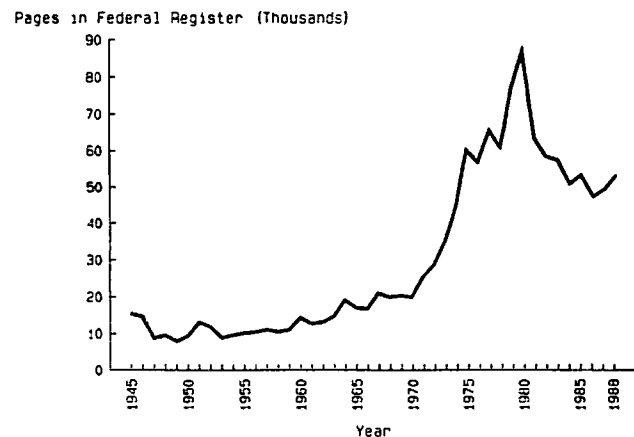
The purposes of this article are to define decision-making writing, show how it can be effectively taught, and illustrate applications of this "real world" writing style. Dependence of decision-making writing on critical thinking skills and advantages for instructors teaching this style are noted.

### Decision-Making Writing

Decision-making writing is defined as a one page presentation of all relevant facts and observations needed to understand an issue and the trade-offs that a decision maker confronts.<sup>1</sup> Since the intent of decision-making writing is to reduce the amount of information that individuals involved in making decisions have to process on a specific issue, its most important feature is conciseness. Important numeric and verbal facts, observations, and concepts are communicated in paragraphs of no more than two or three sentences.

1. Sometimes an issue is so complex that the paper exceeds one page. But, this is rare and usually results because the writer has not clearly defined the issue and/or has not focused the discussion on the most important points. In addition, appendices normally are not included, but occasionally are used to present numerical tables and graphs.

Figure 2. Number of Pages Printed in the Federal Register, U.S., 1945-1988.



The paragraphs are grouped into short homogeneous sections and may contain brief tables of numeric data. Headings for each section are chosen to provide an outline of the paper's major points. Additionally, by limiting the final product to one page, all information is presented within the reader's field of vision. Such a presentation permits the reader to more easily grasp interrelationships among the information presented and avoids the distraction to comprehension that can often result from turning a page.

While important, conciseness does not come at the expense of accuracy, completeness, or objectivity. Otherwise, a garbled or unintended message may be communicated, resulting in an inappropriate decision(s) with potentially disastrous consequences.

Decision-making writing contains elements of both bullet writing and preparation of an executive summary. Similar to the bullet writing seen on news wires, or accompanying press releases by public and private organizations, decision-making writing presents a collection of important ideas, observations, and facts. Unlike bullet writing, but similar to the executive summaries that often accompany large government or business reports, the entries are organized to produce a focused flow: identification of the issue, presentation of facts and analysis, enumeration of options, and justification of conclusions and recommendations. Unlike executive summaries, which tend to emphasize conclusions and recommendations, decision-making writing presents all aspects of an issue in appropriate perspective. Done well, a paper written in the decision-making style illuminates the complex threads which run from the description of the issue to the conclusions and recommendations; it reads as a self-contained paper.

Our experience suggests that a sample paper often aids in understanding the interplay of information gathering, information evaluation, and concise presentation that defines decision-making writing. A sample paper on the greenhouse effect and U.S. agriculture is contained in the appendix.

### **Critical Thinking and Decision-Making Writing**

Decision-making writing depends upon astute application of critical thinking skills. Critical thinking is the evaluation of ideas and information (Ruggiero, 1988; Presseisen, 1987; Ennis, 1985; Beyer, 1985; and Young, 1980). Evaluation starts with the collection of information concerning the key attributes of the issue and potential responses to it. The information is then analyzed by using the scientific method and standard rhetorical devices. The analysis should distinguish verifiable and relevant information from value claims and irrelevant information, identify missing but relevant information, detect biases, uncover stated and unstated assumptions, recognize logical fallacies, and judge the validity of inferences and conclusions. Based on the analysis, salient features of the issue and the benefits/costs of the various responses are identified.

Use of critical thinking skills does not end with the analysis of the issue. The limited space available to present the background information and analysis demands tradeoffs

between conciseness and completeness while at the same time avoiding misleading statements. Critical thinking skills are required to decide which information to present so that conclusions and recommendations made in the paper are seen by the reader to be a logical outgrowth of the presented information. Thus, critical thinking becomes an integral component of the writing process as well as the earlier problem analysis.

### **The Decision-Making Writing Assignment**

Because of the growing use of decision-making writing in both private and public organizations, a decision-making writing assignment has been incorporated into a senior level agricultural policy class at Ohio State University. The assignment involves a federal policy issue of current importance to U.S. agriculture. Students must ferret out information from any source they can discover, analyze the issue and potential policy responses, reach conclusions, and make policy recommendations.

The public policy issue is selected by the instructor. It may be either broad or narrow in scope. Issues have included the U.S./Canadian Free Trade Agreement, the greenhouse effect and U.S. agriculture, the role of pesticides in groundwater contamination, the potential for a marketing loan program for U.S. soybeans, and the U.S.-European Community controversy over use of hormone implants in beef cattle. The issue is changed with each class offering, and all students write about the same issue. As an aid in the search for background material, students are provided with a selected, but not comprehensive, set of readings. Furthermore, economic principles taught in the policy class and prerequisite classes must be used to evaluate the background material and policy responses. Therefore, students are required to use their technical knowledge, critical thinking skills, and written communication skills to produce a concise, unbiased analysis of the assigned public policy issue.

#### **Structure of the Assignment**

In keeping with the definition of decision-making writing, the paper is limited to one typed page. Minimum margin and type size requirements are established so that performance can be evaluated based on subject matter content, depth of the analysis, and written presentation, rather than on creative approaches to cramming words onto one page.

Even students who can critically analyze problems may not effectively communicate their thoughts on paper. They often are not conscious of their readers' needs, thereby omitting elements of their arguments needed to understand the paper's thesis. Consequently, a specific audience is defined: farmers and leaders of farm organizations. By identifying the audience and stressing the importance of using language this audience can understand, the assignment helps demonstrate that written communication needs to be tailored to those being addressed.

Because writing involves an interaction between the provider(s) and users of information, it is a social activity. Evidence also exists that learning is a social activity and that students who collaborate may learn faster than students who study alone (c.f. Slovin, 1990 and the references cited by

Slovin). Therefore, students are assigned into groups of four members. The use of groups also increases the likelihood that students will become sensitive to the variety of opinions and responses that exist on any public policy issue.

Research has found that writing and critical thinking are activities that provide feedback to one another (Hayes and Flower, 1970). Because rewriting involves evaluation of previous drafts, it is at the heart of this feedback process. Therefore, students are graded on two drafts of the paper. This also provides them with the opportunity to rethink their arguments in light of the comments made by an outside observer, i.e., the instructor. Substantive comments are presented in a manner which does not permit students to simply incorporate them directly into the final draft.

Each draft is graded on the following criteria:

Accuracy - are the facts correct?

Appearance - does the paper look professional?

Completeness - is all relevant information included?

Conciseness - is there unnecessary verbiage?

English quality - is the grammar correct?

Impartiality - are arguments and facts presented objectively?

Literary quality - does the paper read well?

An equal weight is assigned to each criterion because it is the collective interaction of all seven criteria that creates the final product.

#### **Student Evaluations**

Almost two-hundred students have evaluated the assignment since it was initiated during Spring Quarter 1986. Student assessments have been measured using open-ended response questions as well as objective questions based on a five point Likert scale which varies from strongly agree to strongly disagree. Over 90 percent of the evaluating students have agreed or strongly agreed that the assignment improved their ability to sort through information and determine what is relevant. Over 85 percent have agreed or strongly agreed that writing the paper sharpened their ability to analyze problems. Over 75 percent have agreed or strongly agreed that their writing skills improved. In summary, almost 90 percent have agreed or strongly agreed that the assignment was a worthwhile learning experience, and two-thirds would recommend including this type of assignment in other classes.

Responses to the open-ended questions have repeatedly revealed that students view the assignment as one of the most challenging, yet worthwhile, they have encountered during their collegiate experience. Many note that their peers can not understand how so much time can be spent on a one page paper. Importantly, former students have reported that this writing experience has enhanced their performance in other classes as well as their employment following graduation.

#### **Summary and Implications for Teaching**

The rapid growth in information and the number of issues decision-makers must address has inevitably raised questions about efficient information management. Technology can speed up the process of information storage, retrieval, and transmission; but effective use of information rests with individuals who can compile it in a useful manner. Decision-

making writing evolved to help individuals effectively compile information about existing and emerging issues as well as make appropriate decisions without being overwhelmed by the volume of information.

Decision-making writing relies upon critical thinking, both to evaluate the issue or problem being addressed and to determine which information should be included in the paper. Student evaluations reveal that the decision-making writing assignment used in the agricultural policy class enhances critical thinking skills. The need for enhancing these skills has become an important theme in recent studies of the performance of the U.S. educational system (c.f. the National Commission on Excellence in Education, 1983; and Boyer, 1987).

The brevity of decision-making writing also reduces the time that instructors must commit to reading and grading the assignment, thus alleviating the time constraints that are often associated with an intensive writing assignment. On the other hand, the amount of time and range of skills students must devote to completing the assignment are extensive.

Besides its use as a stand-alone assignment, decision-making writing can be used as an intermediate step for longer research papers. A paper written in the decision-making style requires students to identify the critical facts, place the facts in their proper perspective, and evaluate them in making judgments and reaching conclusions. In short, a decision-making assignment can be a one-page, mini-term paper that provides the instructor an opportunity to check a student's comprehension of key facts and ideas before the student turns to writing the longer paper.

### **Sample Decision-Writing Paper:**

#### **"The Greenhouse Effect and U.S. Agriculture"**

##### **Background Information**

- The greenhouse effect is the general warming of the world caused by carbon dioxide, chlorofluorocarbons, methane, nitrous oxide, and other gases which permit the sun's rays to enter the earth's atmosphere but prevent the reflected infrared radiation from escaping.
- Levels of greenhouse gases are expected to increase due to the burning of fossil fuels, deforestation, use of man-made coolants, and organic matter breakdown.

##### **Changes in U.S. Weather Patterns**

- Models of U.S. weather suggest that higher temperatures will likely result in less rain in the great plains and, to a lesser extent, the corn belt. In contrast, the climate in northern states will probably become more favorable for crops.
- The frequency of weather extremes, such as drought and hurricanes, also will likely increase.
- However, wide variation exists around these forecasts since the factors that determine weather are not well understood.

##### **Potential Effects on Production Capacity of U.S. Farms**

- Increased temperatures and decreased moisture could reduce national yields of corn, soybeans, and wheat by 10-20%.

- Crop area in the northern states may expand somewhat.
- Higher temperatures will enhance the winter survivability of pests and diseases, thus reducing crop and livestock output.
- Frequency of crop failures will probably increase.

#### Economic Impacts on the U.S. Farm Sector

- Decreased yields will reduce supply, increasing crop prices and income.
- Need for farm price and income support will decrease.
- Livestock income will be pressured by higher feed grain prices.
- Need for disaster relief programs will increase due to more frequent occurrence of extreme weather.
- Pesticide and livestock drug use will expand, thereby increasing the cost of production.

#### Conclusions and Recommendations for Farmers

- While global climatic models suggest some form of greenhouse effect is probable, its impact on the weather in general and U.S. agriculture in particular is difficult to forecast.
- Farmers should support research on the greenhouse effect and development of heat, drought, and insect resistant crops as a precaution.
- Farmers should watch for an increase in extreme weather conditions, which is consistent with most current forecasts of a greenhouse effect.

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# Teaching Creativity for Professional Growth and Personal Reward

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*The subject of developing student creativity is presented based on a model floral design program offered at a two-year technical college within a major university. Specific techniques and factors within the teacher-learning environment are identified as contributing to the enhancement of creative abilities. Students in programs with an emphasis on creative development experience professional and personal rewards.*

## Introduction

Nearly everyone enjoys the thought that they have an element of creativity among their list of talents. This idea, often reinforced by friends and relatives, is a major factor which motivates students to pursue a career in floriculture. What these students may likely not understand at the time they begin their education, is that there are various levels of creativity that they will achieve. Only after they have attained a higher level, are they aware of the personal and professional rewards that are associated with creative development.

## Establishing Programmatic Goals

Creativity can be taught in the classroom. Creative thinking should be an important goal of all programs. However, creativity in the artistic sense has special significance in the area of floral design. The extent to which it is developed and the speed with which it happens is heavily impacted by the faculty and the curriculum. Sporadic attempts to introduce students to new levels of creativity is less effective than frequent contact in a logically developed program. A successful model exists in the Floral Design and Marketing Program at The Ohio State University's Agricultural Technical Institute (OSU/ATI). This two-year technical program within the College of Agriculture has a record for fostering creative talent and producing successful floral designers.

Students begin the program with a basic floral design course which provides two hours of lectures and six hours of laboratory experience weekly. Each subsequent quarter offers at least one design course. Students progress through classes in commercial design, wedding design, contemporary floral design, retail flower shop operation and plants for interior decoration. In addition, at least two quarters are spent in a practicum course to elaborate on recently acquired basic skills. Part way through the program, each individual completes an occupational internship which is accomplished by working full-time in a flower shop under the tutelage of an experienced flower shop manager. The logical and sustained

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