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Important factors in the technical proposal process according to engineering faculty

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Important factors in the technical proposal process according to engineering faculty

by

Janet Louise Nieland Renze

A Thesis Submitted to the

Graduate Faculty in Partial Fulfillment of the

Requirements for the Degree of

MASTER OF ARTS

Department: English
Major: English (Business and Technical Communication)

Iowa State University
Ames, Iowa

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CHAPTER 1. SITUATION AND OBJECTIVES

Introduction

Stalking the wild grant dollar requires some of the same qualities needed for other big game hunting—knowledge, preparation, skill, courage, patience, endurance, and limitless energy (V. White 1975, 292).

Proposals are an important means for obtaining grants, and abundant literature exists, targeted at a wide range of audiences, providing recommendations about how to research and write effective proposals. This literature on proposals appears in sources as varied as journals (from Technical Communication to Engineering Education) technical communication texts, and books devoted to the proposal process. These sources include recommendations to help both professional communication audiences and more specific audiences prepare proposals. In general, these recommendations are prescriptive ("follow steps for success"), linear (not recursive, at least in presentation), or based on lore and common practice.

One of the most common prescriptive approaches to proposals is to provide writers with a checklist. This checklist carries the message—usually implicit, sometimes explicit—that if the writer completes the steps, success will follow (Whalen 1986a, 1987; Loring and Kerzner 1982). Many of these lists contain vague statements, such as "write
descriptively” or “make your proposal easy to read.” For example, Loring and Kerzner present “10 Commandments” for “assuring proposal success,” two of which are “be original” and “be specific” (1982, 358-359).

Another approach separates proposal preparation into a chronological sequence. This approach presumes that the tasks involved in proposal preparation are linear rather than recursive (White 1975; Zallen and Zallen 1976). The process is usually oversimplified into pre-writing, writing, and post-writing stages. For example, Zallen and Zallen provide models for the proposal process; Loring and Kerzner present a flow chart for activities from inquiry to proposal (1982, 23), as do Stewart and Stewart (1992, 5).

A third approach is to recommend practices based on lore or relate tales from an author’s own experiences. While these tales might be interesting or humorous, they do not necessarily provide readers with information about how to approach their own proposal efforts. Helgeson’s chapter on “fatherly advice” is a prime example of this third approach (1985).

These prescriptive, linear, and lore-based approaches to proposal preparation contrast with current rhetorical approaches to professional communication, which see communication in a complex context where writers consider purpose and audience integral to a writing situation. Collectively, the former approaches are problematic because they do not address the individuality of proposal situations, but present a
uniform, universal way to write proposals. In a rhetorical approach, there is not necessarily a single path to preparing a proposal. Writers also need to address the social perspectives of a proposal effort, a concern often neglected in proposal literature.

Recommendations presented in proposal literature are not inherently problematic, but the decontextualized and simplified presentation of them is. It is questionable, then, given the presentation of these recommendations, whether the recommendations are beneficial to proposal writers. If, as Beck and Wegner state, “principles of proposal writing depend on expert testimony rather than on a sound research base” (1992, 124), how do authors of proposal literature know that their recommendations will work for others?

I am curious about whether recommendations from proposal literature could be useful for or are followed by a particular audience of proposal writers. One such audience is engineering faculty. I discuss the unique situation this audience faces in its need to write proposals and the complex issues in the proposal process that recommendations in the proposal literature may or may not address. In order to better examine any gaps between recommendations in proposal literature and practices of engineering faculty, I attempt to validate whether common recommendations in the proposal literature are followed by the audience of engineering faculty.

Engineering faculty are a particularly important group of proposal writers to consider because multiple sources address the ever-increasing pressure on engineering
faculty to obtain external research funds (see, for example, Kaplan 1990; Bube 1990; Loui 1992; J. White 1989; Yeung 1993; Kramberg-Walker 1993). Engineering faculty experience greater pressure to obtain outside funding than do most of their colleagues elsewhere in the university (J. White 1989, 549). External funding has become so important to the survival of engineering colleges that "no document produced by an academic engineer is more important than a research proposal" (Kramberg-Walker 1993, 132). As a result, Kramberg-Walker asserts, "academic engineers must regard the search for external funding as a major part of their academic way of life" (132). While talk abounds about the importance of teaching, state Beaufait and Harris, "engineering faculty are pressured to produce in the research arena and obtain funding for their research rather than in the classroom" (1989, 566).

The majority of funding for engineering faculty is awarded by the federal government, where success rates are 10-20%, and because up to 30% of submissions to federal agencies are rewrites (Moffat 1994, 1921), engineering faculty spend huge amounts of time away from their teaching and research commitments chasing grant dollars. Those who chose to become educators and creative problem-solvers must also become "at least part-time business executives or fund raisers" (Bube 1990, 35).

The importance of success for engineering faculty at obtaining grants is complicated by their lack of preparation to do so. When new engineering faculty begin their careers, they often have little or no formal training in writing proposals or seeking
grants. Some do not enjoy writing in general and may be extremely apprehensive about it, while others may lack confidence in their writing abilities because English is not their native language (Kramberg-Walker 1993, 130). This difficult situation is compounded by the fact that engineering colleges expect great success in proposal efforts early in new faculty members’ careers, yet often do little to orient or provide support for new faculty, “essentially throwing them into the water and expecting instant swimmers” (Beaufait and Harris 1989, 566).

**Recommendations from the Literature on Proposals**

Given an academic engineer’s need to write proposals and seek outside research funding, it may be illuminating to investigate recommendations about the process from proposal literature and examine how those recommendations fit into issues about proposals faced by engineering faculty. Although some authors discuss what not to do, I focus on recommendations about what proposal writers *should* do:

- consider larger goals of the funding agency
- express how proposed scientific ideas fit into current research areas
- establish and maintain contacts
- follow the Request for Proposal (RFP)
- edit and revise the proposal
- utilize relevant writing resources
After looking at each recommendation and related issues, I present questions that form the basis of my investigation.

Consider larger goals of the funding agency

Proposal writers are encouraged to consider to what extent the larger goals of a funding agency impact their chances of receiving funding. For instance, research funded by the National Science Foundation (NSF) ten years ago may no longer be of interest to that agency because of a change in its overall research goals. Several sources (Moffat 1994; McAdam, Maher, and McAteer 1982; Kaplan 1990) indicate that odds for funding are increased if proposal authors address a funding agency's current priorities and research agendas, and that writers would be wise to select an agency whose priorities lie in the researcher's area of interest.

This recommendation to consider larger goals of the funding agency raises issues about influence and politics. Even though researchers may feel their proposed ideas are brilliant, if they cannot convince a program officer of that brilliance, the chance for success is slim. In addition, some topics may be politically volatile, such as alternative energy sources (see discussion in Bube), and therefore agencies may be reluctant to fund the research. If they cannot match their proposed ideas to agency goals, researchers may need to recast their work to address those goals or attempt to make their work appear less objectionable.
Issues about the larger goals of funding agencies and implications for considering them can be expressed as questions: To what extent do engineering faculty think a funding agency's larger goals should be considered in a proposal effort? Do faculty members find out what the larger goals are before selecting a funding agency and writing a proposal? Do faculty address these goals directly in their proposals?

No matter how well-calculated researchers’ efforts are, it is impossible to win every proposal because of the intense competition for research funds. This competition leads to a related recommendation from the literature, that proposal writers consider the acceptance rates of particular funding sources. Competition is stiff because “compared with the late 1960s, the total federal support of research is about the same, but twice as many researchers are competing for the funds” (Loui 1992, 52). Because overall acceptance rates for many federal agencies are around 10-20%, “much effort is expended for few rewards” (Bube 1990, 35). This can be very discouraging, especially for new faculty. McAdam, Maher, and McAteer express this sentiment well: “For many, the preparation and submission of an elaborate proposal for at best uncertain funding is a disincentive to developing a proposal” (1982, 4).

The recommendation to consider acceptance rates raises issues about expectations for engineering faculty. Many new faculty may believe they will be able to pursue research problems of personal interest. On the contrary, as Bube explains, because research can be carried out “only if adequate funding can be obtained, professors must
follow the research dollar to be successful" (1990, 35). As discussed earlier, some departments place intense pressure on engineering faculty to obtain funds, yet are slow to recognize the sometimes extreme difficulty in generating research funds. For tenure in many departments, faculty must have been awarded a certain number of proposals or dollar amount. Administrators might instead consider if faculty have been actively pursuing grants and the total number of dollars generated instead of some set formula for success.

These expectations for engineering faculty lead to several questions: Are engineering faculty discouraged by low rates of acceptance for proposals? If the chance for being funded by the first agency of choice is slim, do engineering faculty alter their proposal to increase chances of being funded by another agency?

**Express new and established scientific ideas**

The second recommendation, to express how proposed scientific ideas fit into current research areas, is a balancing act for proposal writers. Myers notes that the process of writing a proposal “is largely a process of presenting—or creating—in a text one’s role in the scientific community” (1990, 42-43). The best way to create that role may depend on the researcher’s proposed topic of study (e.g., a particularly controversial topic versus an extension of well-established research) and standing in the academic community (new faculty versus internationally recognized researcher), among other factors. Moffat states that “sponsoring agencies are eager to find a novel hook as a way
of differentiating a grant proposal from run-of-the-mill applications. Demonstrating a

grip on reality, however, is equally important" (1994, 1921). Proposers must find a

balance between new and established scientific ideas.

This recommendation, to express how proposed scientific ideas fit into current

research areas, raises issues about how research changes and defines itself, as well as how

it is funded (Myers 1990, 43). If researchers' topics are novel or their approaches to

solving problems are untested, they will have to carefully evaluate how to express their

ideas in order to create an “acceptable role in the community” for obtaining funding.

Closely related to this issue are considerations mentioned earlier about what ideas

agencies will or will not fund. If certain topics are funded, more information will be

produced about them, which in turn leads to more funded research. If, however, funding

is not awarded or cut, research in that area will wither, thus affecting future options for

that topic.

These issues can be expressed as questions: To what extent do engineering faculty

stress the originality of their ideas, the way their work ties to established ideas, or

combine emphasis on new and established ideas in their proposals?

Establish and maintain contacts

Establishing and maintaining contacts at funding agencies is considered critical by

many authors of proposal literature. These contacts, and the information they can

provide, are critical to multiple facets of the proposal process. Kaplan strongly
encourages direct contacts: “The value of personal contact with agency personnel cannot be overemphasized ... personal contact is essential” (1990, 28). Phone calls, letters, e-mail, or personal visits with officers at the funding agency can not only answer questions concerning the RFP and provide more specific guidelines, but also provide an “inside” contact with the funding agency for future efforts (Teague and Heathington 1980, 35).

Through these contacts with funding officers, researchers not only gather information for current proposal efforts but may also have a chance to provide input on a Request For Proposal for future efforts. This input provides researchers with an opportunity to directly impact the RFP and possibly have an edge in developing their own proposal. Although some might see this input as “hard-wiring the RFP” or perpetuating an “incestuous buddy system” (Cole, Rubin, and Cole 1977, 34), others consider it an essential public relations tool for their own research programs and others at their university.

Finally, information from contacts can be used in writing a proposal to better address the intended audience. DeBakey states that knowing the intended audience helps writers decide what to include and how much to elaborate in a proposal (1976, 7). Writing can be misunderstood or even ignored if it is not adapted for the target audience. Proposal writers who consciously adapt their prose to the audience reviewing the document (which may include, but is not limited to, highly specialized peers) usually
have higher success rates (Moffat 1994, 1922).

The general recommendation, to establish and maintain contacts, raises many complex issues, especially regarding fairness in proposal efforts. Are certain researchers receiving grants based on personal influence rather than on merit of their ideas? This suspicion has been hotly contested and, in a 1977 study, disproved (Cole, Rubin, and Cole). However, since almost 20 years later personal contact is still considered vital to proposal efforts, the issue of fairness remains problematic.

These recommendations and issues lead to several questions: How important do engineering faculty consider direct contact with program officers? For a given proposal effort, how often do engineering faculty contact program officers at their targeted funding agency, and what methods of contact do they use? Do engineering faculty often have the opportunity to provide input on an RFP? If so, was it advantageous to their proposal effort to provide input on the RFP? Finally, to what extent do engineering faculty consider a particular target audience for their proposals—that is, do they adapt their writing for a certain level of conceptual difficulty and their wording for a certain level of technical difficulty? Do they consciously adapt their proposals so they can be understood by a particular target audience?

Follow the Request for Proposal

Authors of proposal literature recommend that proposal writers strictly follow the Request for Proposal (RFP). This document, distributed by the funding agency,
presents a detailed statement of requirements, specifications, and elements required in a proposal. The RFP gives "the big picture of what the supporting agency sees as important" (McAdam, Maher, and McAteer 1982, 8). However, not all RFPs provide an easy-to-read recipe for success. Often, important items are buried in legal or bureaucratic jargon, requiring proposal writers to pick apart RFPs or contact program officers to determine what the agency is really looking for. Poorly constructed RFPs can lead to proposals that lack required components and therefore do not receive funding. A helpful RFP might provide proposal writers with information about evaluation criteria so that writers can spend their efforts most efficiently.

This recommendation, follow the request for proposal, raises issues alluded to in the previous section. If the only way to decipher an RFP is to contact the program officer, how are proposal writers to know that everyone is receiving the same information? A published RFP, even one that is jargon-laden and convoluted, is consistent, whereas information supplied orally by program officers—intentionally or unintentionally—may not be.

These issues can be expressed as questions: To what extent do engineering faculty follow or pay attention to RFPs? Do they sometimes find them hard to read? To what extent do they make an effort to address an agency's stated requirements consistently throughout their proposal?
Edit and revise the proposal

Another recommendation from the literature, to edit and revise proposals, is somewhat vague. Editing and revising usually entail more extensive alterations such as rearranging text or restructuring the document for clarity. Some authors (for example, Moffat) say that careful editing is essential for producing the best proposal. Others (like Whalen 1987, 114-128), recommend multiple sets of reviews by several teams.

This recommendation, edit and revise the proposal, raises a larger issue about collaboration. Obviously, some researchers work with peers in their own university. Additionally, many other personnel can be involved with a proposal effort, such as secretaries, editors, and additional colleagues. Input from each of these sources has an effect on the final proposal.

This issue can be expressed in several questions: To what extent do engineering faculty edit and revise their proposals? Is this editing a collaborative or individual effort? Do they involve colleagues, secretaries, or their department chairs? Is their reworking with peers locally or at other universities?

Authors not only edit and revise current proposals, but often go back to previous efforts. Because so few proposals are funded, writers often rework their ideas in order to resubmit for another funding cycle. Moffat (1994, 1922) suggests that faculty talk to program officers for insight about rejected proposals and inquire about changes for resubmission. Whalen (1986b) calls this process of following up on an unfunded effort
"proposal postmortem." Unfunded proposals are rejected for a variety of reasons: lack of new or original ideas; diffuse, superficial, or unfocused research plan; lack of knowledge of published relevant work; absence of an acceptable scientific rationale; and unrealistically large amount of work (Locke, Spirduso, and Silverman 1987, 135).

This recommendation relates back to issues dealing with goals of the funding agency and contacts at funding agencies. Proposal writers need to determine which agencies will fund their proposal, line up alternates in the even the proposal is not funded, and find out through personal contacts how to improve future chances for success. To what extent do engineering faculty want to know why a proposal was rejected? Do they follow up with funding officers for reasons to help with a possible resubmission?

Utilize relevant writing resources

The final recommendation for proposal writers from the literature is to utilize relevant writing resources—for example, books and journal articles on proposals. Two authors (Killingsworth 1983, Haselkorn 1985) provide bibliographies of the proposal literature. As mentioned earlier, there are resources for many different types of proposal efforts, some (such as Kaplan 1990, Bube 1990) that directly address engineering faculty. These resources often provide checklists and specific do's and don'ts for proposal efforts.
This recommendation raises the issue of whether researchers even read what is published on the proposal process. How do they acquire information about writing proposals and participating in the funding process? Do they learn from texts, or do they learn from peers?

This issue leads to several other questions: To what extent do engineering faculty seek out this literature to guide in their proposal efforts? Did they find these sources helpful for their proposal efforts? Was there information about the proposal process rather than just on writing? What were factors addressed?

These recommendations (e.g., consider larger goals of the funding agency) constitute what could be called “best practices” for proposal writing. But are the best practices actually carried out by proposal writers, in particular, engineering faculty?

**Objective**

The objective of my study is to examine recommendations from the proposal literature and opinions from engineering faculty to determine if a gap exists between what proposal literature indicates are best practices for obtaining research funding and what engineering faculty actually do to solicit such funding. To achieve this objective, I used the methodology described in the following chapter. The remainder of this thesis is divided into three chapters: “Methodology,” “Discussion of Results,” and “Suggestions for Future Research.”
CHAPTER 2. METHODOLOGY

To achieve the study's objective, I used a combination of written questionnaire (see Appendix) and open-ended interviews. The Iowa State University Committee on the Use of Human Subjects in Research reviewed this project and concluded that the rights and welfare of the human subjects were adequately protected, that confidentiality of data was assured, and that informed consent was obtained by appropriate procedures.

Profile of Subjects

Subjects were faculty in the departments of Materials Science and Engineering (MSE) and Mechanical Engineering (ME) at Iowa State University (ISU). All members of the two departments were surveyed, 37% of whom returned the questionnaire. The return rate was 44% for MSE (8 of 18) and 32% for ME (10 of 31).

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Sixteen males and two females returned questionnaires. All but three of the respondents are tenured. Combined, these faculty submitted 45 proposals in the most recent University fiscal year (07/01/93–06/30/94). Proposals were funded from a wide range of sources. A large amount of that funding was awarded by government agencies, in particular the Department of Energy (DOE). This may be partially attributed to the close proximity of and joint faculty appointments with Ames Laboratory. Ames Laboratory is a government-owned, contractor-operated U.S. Department of Energy laboratory seeking solutions to energy-related problems through the exploration of chemical, engineering, materials, mathematical and physical sciences. Because of the relationship between ISU and Ames Laboratory, researchers can serve as professors, work with ISU faculty on collaborative projects, and include graduate students in Lab research.

**Questionnaire Generation**

I used a questionnaire because I wanted to detail the academic engineers' “actual beliefs,” which “can never be inferred directly from [their proposals] alone” (Gilbert and Mulkay 1984, 118). Certain recommendations overlap in literature on proposals, so I devised general categories of questions to ask how important those recommendations were to engineering faculty. To determine which recommendations would be examined, I looked for similarities between sources—many authors expressed similar
recommendations but worded them differently. I attempted to find several recommendations that were consistently addressed. I focused on recommendations for what proposal writers should do rather than what they should not do. The general recommendations examined were:

- consider larger goals of the funding agency
- express how proposed scientific ideas fit into current research areas
- establish and maintain contacts
- follow the Request for Proposal (RFP)
- edit and revise the proposal
- utilize relevant writing resources

I then developed questions to examine how strongly respondents felt about each recommendation. Based on respondents' answers to questions about recommendations from the literature, I could consolidate their responses as a measure of consensus.

First I asked respondents about their recent proposal record—how many proposals they had submitted and how many of those were funded. This line of questioning sought to obtain a track record for each subject. Respondents were also asked whether they had received any formal or informal training for obtaining grants or proposal writing and, if so, what type. These questions were asked to determine (a) if respondents received any training (and what type) and (b) if there may be some connection between having training and achieving success in the proposal process.
The second and third sections of the questionnaire contained statements about recommendations made in the literature. Respondents were to indicate how strongly they felt about those statements. A scale of 0.0–5.0 was used so there would be no central number on the scale, decreasing chances that outcomes would gravitate toward the center. Questions were grouped around recommendations from the literature, such as importance of considering the larger goals of the funding agency. There was a short contextualizing statement before each group of questions so that respondents could more accurately express their opinions. These statements were phrased to avoid unintentionally cueing respondents to answer in a particular way. An example from the second and third sections of the questionnaire appears below.

| When writing a proposal document, many authors use wording and explanations appropriate for a certain audience (peers, program officer, reviewers, etc.). | 0.0-5.0 |
| A proposal should be aimed toward a particular target audience (adapted for a certain level of conceptual difficulty/worded for a certain level of technical difficulty). | |
| I consciously adapt proposals so that they can be understood by a particular target audience. | |

A fourth section of the questionnaire solicited short-answer responses about success in proposal writing. Information from this section was later analyzed in light of recommendations from the literature and used to reinforce answers to the second and third sections of the questionnaire.
I tabulated responses from the questionnaire by entering them into a spreadsheet and averaging responses for each question. These averages were then used to indicate a measure of consensus. In questions where responses varied widely, I attempted to identify a pattern for those responses (for example, Were lower numbers from senior faculty? Were higher numbers from new faculty?). By attempting to find patterns in the responses, I was able to hypothesize about possible explanations for those responses.

Open-Ended Interviews

After compiling results from the questionnaire, I interviewed five engineering faculty who had indicated their willingness to participate. Each interview lasted approximately 50 minutes. The open-ended interview questions focused on processes related to proposal writing. A sample question from the interviews is: “Could you please elaborate on why you feel establishing and maintaining contacts is important to the proposal process?” During the interviews, I encouraged faculty to tell stories, provide examples, and offer explanations from their previous proposal efforts.

Interviews were tape recorded with permission of the faculty member and later partially transcribed. Responses from the interviews were used to develop hypotheses about results of the questionnaire. Data obtained from the questionnaire and interviews are analyzed and discussed in the following chapter.
CHAPTER 3. DISCUSSION OF RESULTS

Information obtained from the questionnaires and interviews demonstrated that recommendations from the proposal literature are followed; those recommendations are indeed important factors in the proposal process according to engineering faculty. This study did not ask respondents to rank recommendations in order of importance or indicate to what degree they followed these recommendations. A subsequent study might attempt to determine those relationships. Below I discuss where engineering faculty agreed with recommendations and then where they disagreed or departed from the recommendations.

Agreement with Recommendations in the Literature

Respondents indicated that the most important factors for success in proposal efforts are considering the larger goals of a funding agency, making direct contact with officers at the funding agency, and meticulously following the RFP. As mentioned above, these recommendations are not ranked in order of importance, but are examined in the order presented in Chapter 1.

Consider the larger goals of the funding agency

The importance of considering the larger goals of a funding agency received a high average score (4.7) from respondents. This score indicates that engineering faculty are
conscious of agency goals and the impact those larger goals can have on a proposal effort. Respondents also indicated that they attempt to determine these larger goals (ave. score = 4.2) and address these goals in their proposals (ave. score = 4.1). Dissenters were long-time veterans, which may indicate that they know funding agencies so well that they don’t really stop to consider “is this topic a priority for this agency?”

Respondents indicated that it was helpful to know the chance of being funded for a particular program (ave. score = 4.6). They also indicated that if their chance for funding from their first agency of choice were slim, they might alter their proposal and submit it to another funding agency (ave. score = 4.6).

These responses illustrate how engineering faculty are aware of contextual factors in obtaining funding and the cyclical nature of the process. One interviewee said proposers need to know the “magic words” that program officers want to hear. It doesn’t matter so much what your idea is, but how you cast it into the “hot terms,” or magic words that describe funded topics at that time. Information about those magic words comes from contacts at funding agencies, networking with peers, and investigation of what other topics are receiving funding.

Most respondents indicated that they were sometimes discouraged by low funding rates (3.9); those not discouraged were all extremely successful researchers. One faculty member wrote in the margin that “for most agencies . . . 20% acceptance rate was not bad.” Another stated that “you just expect to get turned down,” and then receiving funding is a “nice surprise.” Figure 1 summarizes the above results.
The larger goals of the funding agency should be considered when developing a proposal. (ave = 4.7)

To what extent do you attempt to determine those larger goals? (ave = 4.2)

To what extent do you address these larger agency goals? (ave = 4.1)

It is helpful to know the chance of being funded for a particular program. (ave = 4.6)

Figure 1. Consider larger goals of the funding agency
Express new and established scientific ideas

As Figure 2 illustrates, engineering faculty indicated that a balance between new and established scientific ideas is important to the success of a proposal (ave. score = 4.4). Responses were fairly strong for express original ideas (ave. score = 4.2) but less so for express established ideas (ave. score = 3.6). Finding a balance between new and established scientific ideas requires engineering faculty to carefully evaluate the wording of their ideas and proposed research in the context of their research and the funding agency the proposal is being submitted to. Again, these answers reflect the awareness engineering faculty have of how expression of ideas affects their chances for funding.
Later in the questionnaire respondents indicated that successful proposals presented a high-quality idea, or “good science.” They defined a high-quality idea as a proven idea, one that had preliminary results to demonstrate that the proposed work was feasible and that they were capable of performing the work. Respondents indicated that faculty should start work on a project before seeking funding or starting a proposal and support that research with seed money or alternative funding in order to have results that bolster their proposal statements. One respondent tied together the quality of the idea with the importance of addressing agency goals: “a successful proposal contains unique, high-quality science which addresses program objectives of the funding unit.”

Figure 2. Express new and established scientific ideas
Establish and maintain contacts

Although there was general agreement about establishing and maintaining contacts, respondents elaborated on the need to do so, which is discussed under "Departure from Recommendations in Literature" (p. 34). Respondents said that contact with program officers during the proposal process was important (ave. score = 4.5) and that they did contact appropriate program officers (ave. score = 4.5). The average number of contacts per proposal effort was 2.22. All respondents indicated that they contacted program officers by phone and six indicated that if possible they tried to visit the officer in person.

These responses continue to indicate the importance of contacts for the proposal effort, not only to obtain information but also for providing input on an RFP and analyzing their audience. Eight respondents indicated that they had had input on an RFP (ave. score of those who had input = 4.5). That input was considered helpful for the success of their proposals (also 4.5). One respondent indicated a score of 5 on input for proposals, but 2 for that input being helpful. In an interview that respondent revealed that the funding decisions for that particular RFP had not been completed, so the faculty member could not verify whether his input was indeed successful.

Respondents indicated that it is important to aim a proposal at a particular audience (ave. score = 4.8), and to adapt proposals to that target audience (ave. score = 4.8).
This stress on audience analysis is consistent with claims in proposal literature. Overall, responses to questions in this category reinforced the contextual nature of writing proposals and the influence contacts have over the entire proposal process. Figure 3 summarizes the above results.

Figure 3. Establish and maintain contacts
A proposal should be aimed toward a particular target audience. (ave = 4.8)

I consciously adapt proposal so that they can be understood by a particular audience. (ave = 4.8)

**Follow the Request for Proposal**

Across the board (ave. score = 4.9), respondents indicated that it is very important to follow RFPs when writing proposals. While proposal efforts in a business situation may allow the proposer to negotiate conditions in the RFP, this is usually not the case for agencies like NSF that engineering faculty would be working with. Therefore engineering faculty need to scrupulously follow the RFP in order to be considered for funding; the high average score indicates they are well aware of this requirement.
Respondents also indicated that it is important to connect ideas between categories (ave. score = 4.4). In some situations the proposer may have flexibility over the structure of their proposal, in which case it might be advantageous to connect ideas between categories to strengthen the overall message. When asked if RFPs were difficult to read, the score was much lower (ave. score = 3.4). Those who indicated a score less than 3 were all very experienced proposal writers, so they may have simply become accustomed to RFPs and agency demands and therefore no longer found RFPs difficult to read. Indeed, in interviews engineering faculty said they no longer have difficulty with RFPs because they are so familiar with those documents.

Many program announcements also list categories for evaluation, with weighted percentages assigned to each category. Most respondents indicated that knowing the weighting of each category was helpful (ave. score = 4.3). They also indicated that the percentage assigned to a category will influence the amount of effort they spend on that category (ave. score = 4.3), but they find it risky to emphasize a category that has a low percentage even if it seems important to them. These responses seem to indicate that engineering faculty acknowledge balances discussed earlier about new and established ideas, as well as balances between following the RFP and expressing personal opinion. Figure 4 summarizes the above results.
It is important to follow the requirements of the program announcement exactly. (ave = 4.9)

It is sometimes difficult to determine what those requirements are (because of a poorly formatted document, vague wording, etc.). (ave = 3.4)

It is important to connect ideas between sections/categories from the program announcement in the written proposal. (ave = 4.4)

It is helpful to know the weighting of each category in a proposal. (ave = 4.3)

Figure 4. Follow the request for proposal
It is risky to emphasize one category that seems important to a proposal if the weighted percentage for that category is low. (ave = 3.6)

Figure 4. (continued)

**Edit and revise the proposal**

All respondents agreed that editing was important to their proposal writing (4.6), but there were very different answers on having others edit (ave. = 3.1). Some completely agreed that having others edit a proposal is important, some disagreed; one respondent even wrote in the margin “how ridiculous.” Obviously, some faculty do their proposal writing independent of other faculty or staff. Faculty indicated editors on a proposal effort were most often colleagues located at Iowa State or Ames Laboratory, and that they sometimes collaborated with faculty at other institutions. Four respondents indicated that they used the Engineering Publication and Communication Services office at Iowa State, which has staff members dedicated to assisting engineering
faculty with proposal efforts. Kramberg-Walker (1993) makes a strong case for such writing centers, yet even though engineering faculty might want help in editing their writing, time constraints often prevent them seeking such help.

I asked engineering faculty if they had others edit their proposals to find out about both (a) if they work with peers in proposal efforts and (b) if they work with writing centers and other proposal support offices. Authors of proposal literature recommend that faculty go to university funding offices to get information on where to seek grants. There is such an office at Iowa State University, Sponsored Programs, which serves as a clearinghouse for proposal information. However, not one respondent mentioned using that office. Respondents stated that engineering faculty need to know from funding agencies what is in the pipeline; Sponsored Programs, however, only provides information about what has emerged from the pipeline. So even though offices like Sponsored Programs might be helpful for faculty in other colleges, engineering faculty need to contact funding agencies directly to find out about upcoming funding requests.

If a proposal is declined for funding, faculty found it very helpful to know why the proposal was rejected (ave. score = 4.7) so that they can revise and resubmit their proposal. If they do not receive reasons why a particular proposal was not funded, they usually ask the program officer why their effort was unsuccessful (ave. score = 4.3). Once again, responses to questions in this entire category point toward importance of establishing and maintaining contacts in proposal efforts. Figure 5 summarizes the
Editing plays a critical role in proposal writing. (ave = 4.6)

I have others edit my proposals. (ave = 3.1)

It is helpful to know why a proposal effort was not funded. (ave = 4.7)

If I do not receive reasons why a particular proposal was not funded, I ask the program officer why my effort was unsuccessful. (ave = 4.3)

Figure 5. Edit and revise the proposal
Departure from Recommendations in the Literature

Respondents to the questionnaire, in one case, and interviewees, in another, did depart from recommendations in the proposal literature. Specifically, the respondents did not frequently utilize writing resources. Although nine respondents indicated that they had read books on proposal writing or procedures, only three indicated a score of three or greater. Those who indicated reading sources on proposal writing techniques found them helpful. Figure 6 summarizes the above results.

Figure 6. Utilize relevant writing resources
A second departure was revealed in the interviews. Interviewees elaborated at length about politics in proposal efforts and the importance of making contacts. The principal point each faculty member raised in interviews was that the ability to obtain grant funds was directly linked to "whom you know." In fact, one interviewee stated that that was the only factor in obtaining funds, that it is impossible to get funding without contacts. Another said that although contacts are vital for unsolicited proposals, the possibility of getting funding for solicited proposals was still good without contacts inside the funding agency.

A closely related response was importance of reputation in the scientific and technical community. One faculty member wrote that reviewers and program officers want to know who researchers are and if they have been successful, which in turn affects future decisions. Three respondents said that knowledge of the external reviewers was also important, because those reviewers must accept and respect the proposed work. Since these reviewers could be program officers at the funding agency or peers at other universities, contacts must also be in the scientific community, not simply within the funding agency.

Another consistent theme from respondents was that getting funding takes a great deal of lead time, often up to two years. During that time, engineering faculty must begin preliminary research and sometimes perform the bulk of the research, establish and maintain contacts at funding agencies, possibly provide input on an RFP relevant to their research area, and submit multiple proposals for funding. One researcher commented
that it takes several attempts and rewrites before receiving funding from an agency. A second faculty member, who had five out of six proposals funded in the most recent fiscal year, said that although long lead times are not uncommon, his proposals often cycle through in a matter of weeks. Much of his funding comes from sole-source grants, and he is highly selective about which grants he applies for. He will only write a proposal if it’s funding is almost certain, which he can determine from very close relationships with funding agencies.

The last item that was mentioned consistently from respondents was that if faculty members start writing a proposal after the corresponding RFP is published, their chance of receiving the award is slim. In other words, to be successful, proposers must know what an RFP will say before publication. Respondents stated that they get information about upcoming RFPs from contacts at funding agencies. They indicated it is always important to have a proposal in progress so that when an RFP is published they are well positioned to meet the stated requirements and receive funding. Although most sources recommend starting with an RFP, Stewart and Stewart’s comment reflects opinions of engineering faculty: “some who prepare proposals have the misconception that proposal preparation starts with the receipt of a request for proposal and is completed when the proposal is submitted to the customer. Nothing could be further from the truth” (44).

In summary, although respondents largely agreed with the recommendations presented in the proposal literature, interviewees placed much greater emphasis on the political and social aspect of obtaining grant funds. The engineering faculty interviewed
described a rather seamless process for obtaining grant funds that continually cycles through maintaining contacts both at funding agencies and in the scientific community and writing proposals. Authors of literature on proposals generally indicated that communication with funding agency personnel is occasional and fact-finding, whereas respondents indicated that communication is continual, and may involve as much promotion and salesmanship as searching for facts.

**Additional Observations**

Just as authors stated in the literature, engineering faculty consider writing proposals for external funding to be critical to their positions (ave. score = 4.8). Even though 83% of respondents were tenured, they agreed that proposal writing was critical to their position. This also reflects the stress several authors placed on proposal writing for engineering faculty, regardless of tenure.

In spite of that importance, few academic engineers received formal training in proposal writing. Of the faculty who returned questionnaires, six respondents indicated they had some training in writing proposals, ten had none, and two respondents did not answer the question. The training occurred during faculty orientations at Iowa State University or another university; one respondent participated in an industrial short course on proposal writing. This general lack of training is consistent with statements in the proposal literature aimed at engineering faculty. However, those who did receive formal training did not differ in number of funded proposals from those who did not
receive training. How, then, can the connection between success and lack of training be explained?

The lack of formal training did not prevent engineering faculty from becoming successful in obtaining funds; instead, they learned how to be successful from peers and colleagues. This informal transfer of knowledge is similar to what writing researchers in another study conclude: "as language users travel from one community context to another . . . they must master new ways of speaking, reading, and writing, ways that are appropriate within each community" (Berkenkotter, Huckin, Ackerman 1991, 193). This is exactly what engineering faculty do in order to become successful members of their academic community; they learn what Winsor calls the "tongues of engineering," (1990, 67) which in this case is how to participate in the proposal process.

Mukerji states that "scientists use their connections to figure out how to make their proposals as fundable as possible" (1989, 62). Mehlenbacher concludes that "getting proposals accepted has more to do with the political 'talk' that takes place between researchers and interested individuals within funding agencies than with the actual proposals that researchers eventually submit for review" (1994, 159). Engineering faculty appear to concur.
CHAPTER 4. SUGGESTIONS FOR FUTURE RESEARCH

Although the recommendations from proposal literature are largely followed by engineering faculty, academic engineers place more emphasis on political factors in the proposal process. It matters not so much what you know or what you are capable of, but rather whom you know. This conclusion is echoed in Mehlenbacher: “proposals are never written in isolation; they are written, submitted, and funded as part of a complex social process” (1994, 159). Through learning the ropes from peers and colleagues, the engineering faculty are “able to adapt their discourse over time to achieve various intellectual, social and professional ends” (Berkenkotter, Huckin, Ackerman 1991, 212) to receive funding.

Some recent work on proposals tends to reflect this “social turn.” The trend in the literature seems to involve a movement away from the prescriptive and generalized—as characterized by checklists and general injunctions—to an acknowledgment of the social aspects of the proposal process—for example, the writer’s developing role within a scientific community, the writer’s relationship with program officers and reviewers, and the persuasion necessary to project that role and to persuade those audiences. The need for persuasion, or rhetorical appeal, is strong in works by DeBakey (1976), Beck and Wegner (1990, 1992), and Cole (1992).
A recent book like *Writing Winning Business Proposals*, by Freed, Freed, and Romano (1995) is a particular case in point. This book is really a step-by-step manual that helps writers to understand the roles reviewers play in the evaluation process, identify their hot buttons, analyze the competition, and use themes persuasively to negotiate the terrain between the writer and the reviewers so that alignment between both parties is achieved. Although the title of that text implies a strictly workplace audience, topics discussed in that work are of use to anyone writing proposals.

Even though there was no significant difference in funding levels between engineering faculty who received training in the proposal process and those who did not, all the faculty interviewed recommended that universities place more emphasis on writing, especially persuasive writing, in the engineering curriculum so graduates have more experience writing workplace documents. An author from industry (Jacobs, in *Real World 101*) wrote that “while traditional college technical programs do an excellent job of teaching the nuts and bolts, the new engineer would be even better served if universities also taught written and oral communication skills. We need the ability to sell ideas. Although there is barely enough time now for the required courses in four years, making time for financial, communication, and team-building experience is as important as technical requirements” (1992, 22).

One interviewee said that it would be extremely helpful if engineering students were exposed to the terminology of proposals, or language of funding, such as “cost plus fixed fee,” “invitation for bid,” and so on. He felt a “business of engineering” course
fixed fee," "invitation for bid," and so on. He felt a "business of engineering" course would better prepare engineering students for jobs both in academia and industry, because more and more engineers are expected to contribute to their company's bottom line. He indicated that this course could be beneficial for undergraduate as well as graduate students. If students are going into graduate programs, the interviewees indicated that the need for writing training increases rather than decreases because those with masters and doctorates fill more specialized positions and employers will probably have higher expectations of the communicative abilities of these graduates and may be less willing to accept poor writing.

Because engineering faculty both participate in the proposal process and have an opportunity to directly influence new generations of faculty, perhaps part of the responsibility for informing students about communication expectations lies with them. Yet professional communicators can play a significant role in disseminating information about proposals and other documents by continuing to examine connections between communication theory and genre.
REFERENCES


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I would like to thank my family and friends for their continual support of all my endeavors. My parents have been ever-confident in my abilities—thanks!

Finally, I want to acknowledge my husband, Kevin, for his animated insights on graduate study and his devoted companionship, which have been a blessing.
APPENDIX. RESEARCH QUESTIONNAIRE
IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

Interoffice Communication

DATE: January 18, 1995
TO: MSE and ME Faculty
FROM: Janet Renze, M.A. student in Business & Technical Communication
RE: Consent to participate in research

I am asking each of you to participate in research for my master’s thesis. My research deals with engineering proposals and the process for obtaining outside funding. Here is some information about my research methods and your participation in my study.

As you know, the whole process to obtain outside funding for research includes many activities and documents. Steps in the process include researching topics of interest, contacting personnel at funding agencies, possibly providing input on program announcements, writing a document that will be submitted to the funding agency, and perhaps others. Depending on the funding agency (such as NSF, DOE, ONR, etc.), the proposal document could be a few paragraphs, 10 pages, or multiple volumes. The amount and type of contact with funding agencies could also vary greatly, from one phone call to multiple trips to different cities. To get a better understanding of how all the parts combine in the effort to obtain funding, I am interested in all activities that relate to the "proposal process."

By filling out the attached consent form and questionnaire, you will be providing me with valuable data about the proposal process. If you are willing, I would also like to discuss the proposal process with you in a one-hour interview. There is a section at the end of the questionnaire for you to indicate your willingness to participate in an interview.

Below are topics I need to notify you about in order to comply with Human Subjects regulations.

Time needed—The questionnaire will take about 30 minutes. If you would be willing to participate in an interview, please allow an additional 1 hour.
Location of the research activity—The questionnaire and interviews will take place at a time and location of your convenience.
Confidentiality—I will ensure confidentiality by using pseudonyms when reporting this research. All identifying information will be removed.
Identifier codes—No identifier codes will be assigned to subjects; pseudonyms will be assigned to protect subjects’ identities.
Future contact—Future contact beyond the questionnaire and/or interview is not expected.
Voluntary participation—Participation in this research project is voluntary; nonparticipation will not affect evaluations.
Giving consent—If you are willing to participate in this research, please read, sign, and return the enclosed consent form. Thank you for your help.
Consent to participate in research:

for subjects

I, ____________________________________________, am willing to participate in research conducted by Janet L. Renze. I understand that results of the questionnaire and interview may be included in academic or professional writing by Janet L. Renze. I am willing to fill out a questionnaire; an optional interview will take approximately one hour. I understand that all subjects and incidental individuals will be referred to by pseudonym and that the identities of all research subjects will be protected. I understand that there is no risk associated with this research, that the researcher will freely answer any inquiries about her research methods, and that I am free to withdraw my consent and discontinue participation at any time without prejudice.

______________________________
Signed

______________________________
Date
## Background Questions

1. How many proposals have you submitted in the last 3 fiscal years (07/01/91–06/30/94)? (include co-authorship) ____________________________

2. How many of these proposals were accepted for funding? _________________

3. How many proposals did you submit in FY94 (07/01/93–06/30/94)? __________

4. How many of these proposals were accepted for funding? _________________

5. What was the total funding for these FY94 proposals? $____________________

6. Have you received any formal or informal training in proposal writing? Yes / No

7. If yes, please explain what type of training you received (undergraduate course, graduate course, informal, etc.) __________________________

## Factors in Writing the Proposal Document

For the following questions please respond using a scale of 0.0-5.0 (can use one decimal point) to indicate
0.0 = strongly DISAGREE 5.0 = strongly AGREE 0.0-5.0

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<td>8. Writing proposals is an integral part of my academic position.</td>
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<tr>
<td>When writing a proposal document, many authors use wording and explanations appropriate for a certain audience (peers, program officer, reviewers, etc.).</td>
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<tr>
<td>9. A proposal should be aimed toward a particular target audience (adapted for a certain level of conceptual difficulty/worded for a certain level of technical difficulty).</td>
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<tr>
<td>10. I consciously adapt proposals so that they can be understood by a particular target audience.</td>
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<td>Some authors stress originality of their ideas in writing proposals; some “play it safe” by using widely accepted ideas and branching out from there. Other authors feel it is important to combine new and established scientific ideas in a proposal.</td>
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<tr>
<td>11. It is important to stress originality of ideas in a proposal.</td>
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<td>12. It is important to stress widely accepted ideas in a proposal.</td>
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<td>13. It is important to combine new and established scientific ideas in a proposal.</td>
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Some authors feel it is important to recognize the larger goals of a funding agency (what is on their current agenda) to improve their chances of receiving funding.

14. The larger goals of the funding agency should be considered when developing a proposal.

15. To what extent do you attempt to determine those larger goals?

16. To what extent do you address these larger agency goals?

*For most solicited and unsolicited proposals there is a program announcement that gives specific details about sections/categories and information required in the proposal document.*

17. It is important to follow the requirements of the program announcement exactly.

18. It is sometimes difficult to determine what those requirements are (because of a poorly formatted document, vague wording, etc.)

19. It is important to connect ideas between sections/categories from the program announcement in the written proposal.

*Many program announcements list categories for evaluation, with weighted percentages assigned to each category.*

20. It is helpful to know the weighting of each category in a proposal.

21. If a certain category has a large percentage of points, I spend more effort on that category.

22. It is risky to emphasize one category that seems important to a proposal if the weighted percentage for that category is low.

23. Editing plays a critical role in proposal writing.

24. I have others edit my proposals.

25. Who are these editors? (colleagues, secretary, department chair, etc.)

26. Where are these editors (ISU, another university, etc.)
There are many resource materials about proposal writing, such as textbooks and articles in technical journals. Some proposal writers seek out these materials and consider them to be helpful.

27. I have read books and/or articles about proposal writing.

28. I found these books and/or articles helpful for my proposal writing techniques.

29. I have read books and/or articles about factors in the proposal process other than writing the proposal document.

30. These other factors discussed were

<table>
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<th>Other Factors in the Proposal Process</th>
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<td>Before the Request for Proposal (RFP) is published, many scientists and engineers have a chance to provide input on what the RFP's criteria should be. This gives these people an opportunity to directly impact the RFP and possibly have an edge in developing their own proposal.</td>
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31. I have had a chance to provide input on an RFP.

32. I found it advantageous to provide input on an RFP.

33. It is helpful to know the chance of being funded for a particular program.

34. I am sometimes discouraged by the low rates of funding for proposals.

35. If the chance for being funded by my first agency of choice is slim, I might alter and resubmit my proposal topic so that it has a chance of being funded by another agency.

36. Direct contact with program officers is important.

37. I contact the officer for the program I am submitting a proposal to.

What means of contact do you use? __________________________________________

Average number of times per proposal I contact the program officer ____________
After a proposal effort has been declined for funding, the author(s) sometimes find out reasons why their proposal was rejected.

38. It is helpful to know why a proposal effort was not funded.

39. If I do not receive reasons why a particular proposal was not funded, I ask the program officer why my effort was unsuccessful.

Determining Success in Proposals

40. What is a successful proposal—one that is funded, well-written, or both?

41. Are there any other factors that make a proposal successful? What are they?

42. When you win a proposal, what makes it a winning effort?

43. When you lose a proposal, what makes it a less-than-successful effort?
44. How do you calculate the “hit rate” (overall success) of a proposal writer?

Is it \( \frac{\# \text{ won}}{\# \text{ submitted}} \) or \( \frac{\$ \text{ won}}{\$ \text{ sought}} \)? Something else? Please explain.

Future Research

I would be willing to discuss my experiences with the proposal process. This interview would take about 1 hour and would be scheduled at a time convenient for the faculty member. Please contact me to set up this interview.

Name

Thank you for your assistance! Please return the signed consent form and this questionnaire to the labeled manila envelope in my mailbox in the MSE main office, 3053 Gilman.

If you have any questions, please contact me at 294-6639 or jirenze@iastate.edu.

—Janet Renze