

## TECHNICAL WRITING: WHO NEEDS IT?

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Although technical writing is coming to be accepted as a respectable course offering in engineering programs, it is still regarded as an "add-on" by many faculty members - something to be used to fill an open slot when other courses are not available. To some extent, this is an understandable viewpoint. Since almost any legitimate technical course apparently would be of more potential value to engineering students, why should they be made to take technical writing?

The answer is that technical writing is usually very important to a student's success in the engineering profession. After graduation, an engineer may seldom or never use some of the technical courses he has taken - and there is usually no way of predicting just which ones he will use and which he won't - but all will be called upon to write.

I recently undertook a survey to determine the experience of a group of prominent and successful engineers with respect to technical writing and to solicit their opinion of its importance to them and its place in the engineering curriculum, and of the ideal content of a technical writing course. The major findings of the survey are presented below.

### Method

The information reported here was gathered by a simple mail survey of a substantial group of prominent engineers. Because the people contacted were busy engineers and executives with heavy demands on their time and little to gain from responding to the survey, the questionnaire was kept short (11 questions) and the process of answering simple. Each questionnaire was sent out with a form letter of transmittal on which the recipient's name was individually typed. The letters did not suggest an opinion either favourable or unfavourable to technical writing in the engineering curriculum, and the signature block indicated that I am on the faculty of the School of Engineering - not that I teach technical writing.

Names of the recipients were chosen from the 1973 edition of Engineers of Distinction published by the Engineers Joint Council. The first name on each page of the main listing was used, with the exception of faculty members and academic administrators, persons listed as living outside the United States, and persons listed as members of the U.S. armed forces. (Had the latter been included, it might appear to some that their responses were in some way biased because the survey was conducted by a member of the faculty of an Air Force school.)

QUESTIONS ABOUT THE RESPONDENTS. Eight questions concerned the respondents' experience in their profession.

1) How many years of professional experience have you had? Include industrial, business, consulting, government, and management experience - not academic experience.

Minimum number reported	12
Maximum number reported	63
Mean years per respondent	32.94

2) About what percentage of your time is spent in writing?

Minimum percentage reported	1%
Maximum percentage reported	90%
Mean percentage per respondent	24.35%

3) About what percentage of your time is spent working with materials that other people have written?

Minimum percentage reported	1%
Maximum percentage reported	90%
Mean percentage per respondent	30.9%

4) How important is the writing that you do, and is the ability to write effectively needed in your present position?

Minimal importance	0
Some importance	9
Very important	124
Critical importance	110
No response	2

5) Generally, have you spent more or less of your time writing as your responsibilities increased?

More	155
Less	77
Same	7
No response	6

6) Have you spent more or less of your time working with written material as your responsibilities increased?

More	230
Less	8
Same	3
No response	4

7) To what extent has the ability to communicate on paper affected your own advancement in responsibility?

Helped	236
No effect	5
Hindered	3
No response	1

It should be noted that two of the three people who checked the "hindered" box added notes to the effect that it was their initial inability to write effectively that hindered them. In the effort to keep the form and answers simple, some ambiguity was introduced here.

8) When you select or approve someone for advancement, you must of course, consider many factors. If an individual is otherwise qualified, can inability to write effectively delay or prevent advancement?

Ability to write is not usually important - has little or no effect on selection	1
Ability to write is sometimes helpful - may have some effect on selection	25
Ability to write is usually important - often affects selection	153

Ability to write is usually critical - has strong effect on selection 63

No response 3

QUESTIONS ABOUT THE CURRICULUM. These questions concerned courses in technical writing.

1) Should a course in technical writing be included in scientific and engineering curricula?

No 5

As an elective - no effort to encourage students to take it 3

As an elective - encourage students to take it 39

As a required course 196

2) Some courses in technical writing are good and others are pretty poor. If a course in technical writing is included in the curriculum, what topics should be covered?

	Essen- tial	O.K.	Not Import.	No Resp.
Grammar and syntax	165	75	0	5
Mechanics (punctuation, abbreviations, capitalization, use of numbers, etc.)	120	103	12	10
Style & tone of expression	117	115	7	6
Clarity of expression	239	4	0	2
Analyzing a situation and producing a communication to fit the reader's needs	209	31	0	5
Organization of reports and other communications	189	50	3	3
Finding and using published information	90	127	22	6
Process of writing the draft and completing the finished document	151	79	7	8

Sixty-two of the respondents listed one or more additional suggestions for course content. Brevity and conciseness (under a variety of names) were the most often mentioned (15 mentions). Other topics received only scattered mention.

3) What should be the main emphasis in such a course - the most important things that a student should learn or be able to do as a result of taking it?

Of the 245 respondents, 207 supplied specific answers to this question. Four points made most often were as follows: (The terms used to identify the categories are those that occurred most often in the remarks, the respondents having stated essentially the same points in a variety of ways.)

Clarity (directness, simplicity, unambiguousness, comprehensibility)	109
Brevity (conciseness, compactness, no extraneous words, succinctness)	73
Logical order (organization of ideas, continuity of thought, outline, not jump around)	53
Write for the reader (user's needs, reader's viewpoint)	40

#### Comments

Following the specific questions, respondents were invited to add "any comments about the importance or relative unimportance of the ability to write effectively for scientists and engineers" that they wished or "any suggestions about courses in technical writing". One hundred sixty-nine of the respondents added comments either in the space provided or in accompanying letters. Although other points were touched upon, the majority of the comment was directed to five points:

1) The critical importance of effective writing to individual advancement. Generally, people who cannot write well will not be promoted to positions of greater responsibility.

2) The importance of effective written communications in business, industry and government.

3) Deficiencies in the abilities of young engineers to write effectively.

4) Common deficiencies in written communications and what is needed to make them better.

5) Possible content and emphasis in courses in technical writing.

#### Results

Of the 348 questionnaires mailed, 245 replies were received and 16 were returned as undeliverable, yielding a 73.8 percent return.

#### Summary

The results indicate that the respondents spend a substantial portion of their time (24%) writing, that the writing they do is very important, often critical, to their positions, and that their ability to write effectively has helped them in their own advancement. Further, a substantial proportion of their time (31%) is spent working with material that others have written. They are acutely conscious of the need for effective written communication, and find fault with many of the written communications with which they deal. Many feel that young engineers are deficient in their ability to communicate on paper, a feeling doubtless based on the substantial amount of time spent working with materials written by some of the young engineers concerned. They indicate that the ability to write is usually important or critical when they consider qualified men for advancement. As one respondent commented, "In my long experience and association with scientists and engineers, I can't remember a single instance of anyone advancing to a position of significance who could not express himself effectively on paper."

With such recognition of the importance of effective technical writing to the engineer, it is not surprising that the vast majority of the respondents feel that technical writing should be a required course in engineering curricula. Most of the remainder think it should be an elective that all students should be encouraged to take,

and less than 4 percent differ with this judgment. The respondents indicated that the main emphasis in such courses should be on teaching students to analyse a writing situation and then produce a clear, direct, logically developed communication that will meet the reader's needs without burdening him with extraneous material or long-winded verbiage. Special emphasis should be placed on the need for clarity and ready comprehensibility.

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The full report on this survey (AFIT TR 75-5, Technical Writing: Its Importance in the Engineering Profession and its Place in Engineering Curricula, Air Force Institute of Technology, Wright-Patterson Air Force Base, Ohio) is available from the Defense Documentation Center and the National Technical Information Service. A limited number may be obtained from AFIT/ENG, Richard M. Davis, School of Engineering Building 640, Wright-Patterson AFB, Ohio 45433.

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