Perceptions of Professional Engineers and Architects Regarding Effective Technical Communication

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Abstract

This descriptive cross-sectional research study examined perceptions of time spent by architects and professional engineers for reading, writing, and evaluating various information products, as well as their perspectives of specific quality characteristics and the relative significance in meeting work goals. Professional engineers and architects were surveyed at seminars held at eight locations in seven states. Descriptive statistics were then used to investigate perceptions and relationships. Findings indicate architects and professional engineers spend the most amount of time reading correspondence and the least amount of time reading management reports. Respondents considered correspondence to be the most important reading activity. Participants also spend the most amount of time writing correspondence, closely followed by nearly equal time spent writing and editing technical reports and proposals. Finally, participants rated organization, comprehensiveness, and accuracy as the most important aspects while indicating mechanical issues such as grammar and spelling as the least important aspects of technical documents.

Introduction

An essential element in the workplace, written communication allows professionals to read and study information, share information with others, and keep information for future reference. The vitality of the United States economy depends on written communications. Information provides companies with a competitive edge, speeding critical decision making and allowing job specialization. Clear and accurate communication skills are therefore essential for conducting effective and successful businesses. Conservative estimates indicate U.S. workers spend at least 20 percent of their time writing in a technical or business occupation while professionals in engineering and technology careers spend as much as 40 percent of their time writing (Anderson, 2010). Other studies suggest that writing is the most prevalent activity for professional engineers, requiring as much as 70 percent of their typical workday (National Commission on Writing [NCW], 2004).

Considering the amount of time and effort devoted to on-the-job writing tasks, developing business and professional writing skills should be an important part of the university education of professional engineers. College-level technical writing courses are supposed to prepare engineering students for professional writing requirements. A time-consuming process for both teachers and students, though, the teaching and practice of business and professional writing skills are often limited (NCW, 2003). Surveys indicate there is considerable variation in the amount of participation in good writing practices and various genres (NCW, 2003). For most college-level writing assignments, the majority of undergraduate students reported they do not discuss ideas with their instructors beforehand or receive feedback on completed work. Furthermore, almost 80 percent do not take advantage of whatever campus-based or online writing or tutoring services are available (Paine, Anderson, & Gonyea, 2008).

Writing continues to be an undervalued discipline in post-secondary education, and some people believe American businesses suffer significant financial consequences as a result of graduates being unprepared for job-related writing tasks. According to a recent survey of 120 businesses employing more than 4 million workers, American corporations spend more than $3.1 billion annually to fix problems in writing deficiencies (NCW, 2004). Taxpayers bear the burden of addressing writing deficiencies in the public sector as state governments spend $221 million annually improving the writing skills of state employees (NCW, 2005).

Needs analysis for business and professional writing skills ideally considers both the immediate academic needs of students and their future career needs. Several efforts have been made to examine the role of writing in the classroom and in the workplace. In the general field of science and engineering, a considerable body of literature addresses immediate academic coursework and graduate student research writing task needs (Gosden, 1993; Kaneko, Rozycki, & Orr, 2009; Kuo, 1999; Malcolm, 1987; Meyers, 1989; Olsen & Huckin, 1990). Likewise, extensive analysis of the focused needs of engineers who continue into graduate education and eventually become researchers is also available (Anthony, 1999; Anthony, 2001; Posteguillo, 1999; Shehzad, 2007). This research has assisted educators with curriculum design and related instructional material for teaching professional engineers.

To analyze the importance of writing in the public and private sectors, the National Commission on Writing surveyed the opinions of human resource personnel in major American corporations and state government human resources directors who oversee civil servants working in state agencies (NCW, 2004; NCW, 2005). According to the results, respondents universally agree on the importance of writing for professional workers and report that writing skills are a basic consideration in hiring and promoting employees. However, little has been done to study the actual time spent by frontline professionals for reading, writing, and evaluating various information products or their perspectives on the importance of writing related to meeting specific work goals. Furthermore, identifying elements of written communication which offer the greatest potential to enhance workplace value also requires an effective measurement of product quality. Quantifying effective quality characteristics for information products, though, has proved difficult due to a lack of consensus about those definable elements representing quality (Cunningham, 2006; Hart-Davidson, 2001; Rainey, Turner, & Dayton, 2005; Turner & Rainey, 2005; Turner, 2004; Whiteside, 2002; Whiteside, 2003).

University engineering and writing instructors apparently tend to agree on what constitutes good technical communication. In “What is ‘good’ technical communication? A comparison of the standards of writing and engineering instructors,” Summer Smith found the criteria for reading and evaluating student writing in the respective disciplines were basically comparable (2003). On the other hand, in “Perceptions of memo quality: A case study of engineering practitioners, professors, and students,” Nicole Amare and Charlotte Brammar reported significant gaps in perceptions of workplace writing quality between industry practitioners and post-secondary educators. The responses to textbook business memo examples indicated content and organizational aspects were more important to working engineers while stylistic issues were the most significant to professors (2005).

To assess real-world writing perspectives of practitioners, the principal investigator conducted a comprehensive survey of participants at continuing education seminars for architects and professional engineers. The primary objective of this descriptive cross-sectional research study was to collect data on

the perceptions of actual working professionals regarding the time spent reading, writing, and evaluating various information products, as well as their perspectives of the importance related to meeting work goals. To identify effective written technical communication characteristics as perceived by working professionals, data was also collected regarding the importance of several quality characteristics and relative significance for effective written technical communications. Under the supervision of their professor, two undergraduate researchers then analyzed the data and used descriptive statistics to investigate perceptions and relationships. The purpose is that these findings about workplace writing tasks may be useful for needs assessment of curricula emphasis and instructional materials so that university students are equipped with skills that allow them not only to pass their classes and graduate, but also to perform with excellence in their future careers.

Research Questions

The study involved quantitative research and analysis of perceptions of time spent by architects and professional engineers for reading, writing, and evaluating various information products, as well as their perspectives of the importance of these activities in meeting work goals. Information on perceptions of the importance of several quality characteristics and relative significance for effective technical communications was collected to address the following research questions:

1. How often do architects and professional engineers spend reading and writing information products (correspondence, meeting minutes, technical reports, management reports, proposals, or manuals) and evaluating technical documents?

2. What are architects and professional engineers' perceptions of the relative importance of these activities in supporting or meeting their professional objectives?

3. What specific quality characteristics (completeness, stylistic accuracy, technical accuracy, appropriateness, conciseness, correct grammar, and spelling) are considered by architects and professional engineers in evaluating technical documents?

4. What are architects and professional engineers' perceptions of the relative value of these quality characteristics for effective technical communication?

Methodology

A survey questionnaire was prepared, and the descriptive cross-sectional research study received the approval of the Radford University Institutional Review Board (IRB). After beta-testing the instrument, attendees at continuing education seminars for architects and professional engineers were surveyed using a Likert scale and rank order questionnaire. The questionnaire was designed to be completed immediately after participants registered and before the start of the continuing education seminar. On average, the surveys took approximately 20 minutes to complete. Respondents were asked to answer seven questions first with Likert scale responses followed by an equal number of corresponding rank-order questions for each of three separate subject areas. Finally, respondents were given the opportunity to supply additional written comments and were asked for demographic information regarding gender, age, and occupation title. The four-page survey instrument is provided in Appendix A.

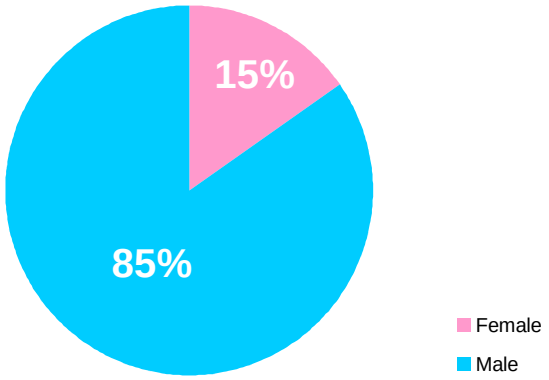
During an eight-month period, from March to October 2009, questionnaires were distributed and responses collected at full-day seminars held at eight locations in seven states. These included two "Writing Construction Specification" seminars for architects and professional engineers in Louisville, KY, and Columbia, SC, and six "Technical Writing for Engineers" seminars in Roanoke, VA; Somerset, NJ; Columbia, MD; Fairfax, VA; Salt Lake City, UT; and Clayton, MO.

The principle investigator, Dr. Don Cunningham, collected 185 responses and tabulated the data. Ms. Gabrielle Ness and Ms. Caitlin Webb, under the direct supervision of Dr. Jill Stewart, chair of the Department of Math and Statistics, then analyzed data through an array of descriptive statistics. Means, standard deviations, correlation coefficients, and relative frequency distributions were then used to investigate perceptions and relationships.

Responses

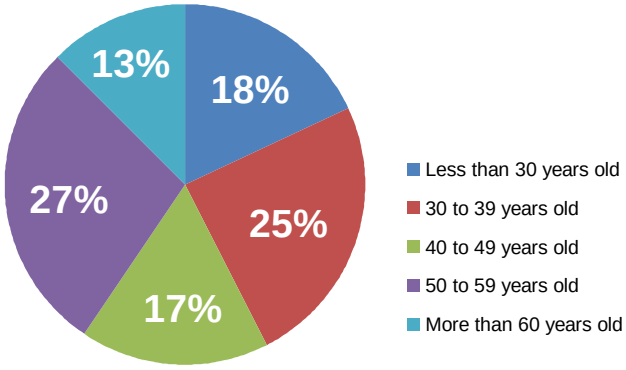
Of the 185 survey participants, 184 responded to the question regarding gender. Male respondents were the majority with 156 males (85 %) compared to 28 females (15 %). Figure 1 illustrates the gender distribution.

Figure 1. Gender



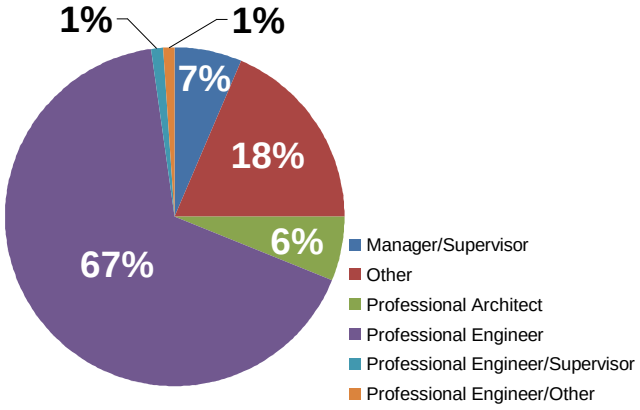
Participant ages were fairly equally represented with slightly more in the 50-59 year old range. Of the 183 participants answering this question, 33 (18 %) were less than 30 years old, 45 (25 %) were 30-39 years old, 31 (17 %) were 40-49 years old, 51 (27 %) were 50-59 years old, and 23 (13 %) were more than 60 years old. Figure 2 illustrates the age group distribution.

Figure 2. Age



For occupation, a few responses indicated multiple choices. Of these, 124 (67 %) selected professional engineer including 3 (2 %) who indicated both professional engineer and manager/supervisor or both professional engineer and other. The other respondents included 11 (6 %) selecting professional architect, 14 (7 %) selecting manager/supervisor, and 36 (18 %) selecting other. Figure 3 illustrates the occupation distribution.

Figure 3. Occupation



Results and Discussion

Regarding time spent reading or evaluating technical written communications, respondents were asked to answer questions about frequency of reading six different document types (correspondence, meeting minutes, technical reports, management reports, proposals, and manuals) and frequency of evaluating technical documents. Each question was answered with Likert scale responses ranging from “Very

Rarely" to "Very Often." Figure 4 shows the Likert scale questions concerning job-related reading/evaluating activities.

Figure 4. Frequency of Job-related Reading/Evaluating Written Communications Questions

Please respond to the following questions. Select the one response which most accurately reflects your answer. If the situation does not apply to you, select the response labeled "N/A."

Doing my job involves...	Very Rarely	Rarely	Neutral	Often	Very Often	N/A
Reading correspondence (letters, e-mail, faxes)	☐	☐	☐	☐	☐	☐
Reading meeting minutes	☐	☐	☐	☐	☐	☐
Reading technical reports	☐	☐	☐	☐	☐	☐
Reading management reports	☐	☐	☐	☐	☐	☐
Reading proposals	☐	☐	☐	☐	☐	☐
Reading manuals	☐	☐	☐	☐	☐	☐
Evaluating documents	☐	☐	☐	☐	☐	☐

Table 1 provides the distribution of percentage responses regarding frequency of work-related reading and evaluating written communication materials. The mean and standard deviation is also presented with participant responses scored from 1 to 5 ("Very Rarely" = 1; "Very Often" = 5).

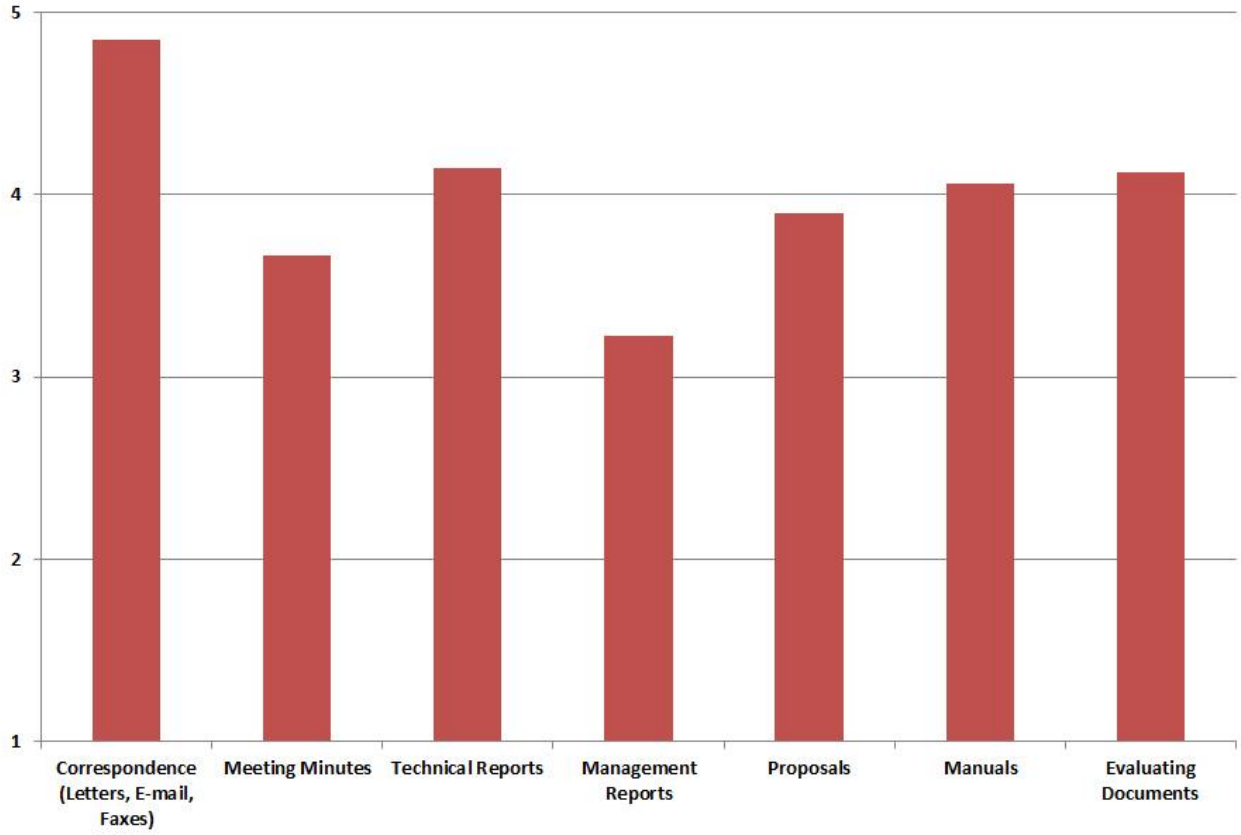
Table 1. Work-related Reading or Evaluating Written Communication Materials Percentage Responses

Question	Very Rarely	Rarely	Neutral	Often	Very Often	Mean	Std. Dev.	Responses
Reading correspondence (letters, e-mail, faxes)	0.6	0.0	1.7	9.9	87.8	4.86	0.48	181
Reading meeting minutes	5.6	14.0	16.3	36.0	28.1	3.68	1.19	178
Reading technical reports	1.6	3.3	13.2	42.3	39.6	4.14	0.91	182
Reading management reports	6.2	23.2	30.5	22.0	18.1	3.24	1.19	177
Reading proposals	2.8	11.0	14.9	35.9	35.4	3.90	1.10	181
Reading manuals	0.5	6.6	18.6	35.0	39.3	4.06	0.96	183
Evaluating documents	0.0	7.1	15.8	34.4	42.6	4.11	0.96	183

A repeated measures analysis of variance was used to test the equality of mean responses on the frequency that respondents spend on the seven variables related to reading or evaluating documents. The means were found to be significantly different ($F = 3.55$, $p=.0018$). Tukey's multiple comparison test

reveals that, although the mean perceived frequencies of reading meeting minutes, technical reports, proposals, and manuals are not different, the mean frequencies of reading correspondence and evaluating documents are significantly different from the mean frequency of reading management reports. Figure 5 graphically illustrates the means of percentage responses regarding frequency of work-related reading and evaluating written communication materials. In tabulating the data, participant responses were scored from 1 to 5 ("Very Rarely" = 1; "Very Often" = 5).

Figure 5. Reading/Evaluating Questions Mean Likert Responses



Respondents were next asked to indicate their perceptions concerning the relative importance of job-related reading/evaluating activities. In this question, respondents were asked to rank order reading six different document types (correspondence, meeting minutes, technical reports, management reports, proposals, and manuals) and evaluating technical documents in relation to the importance of their work. Figure 6 shows the rank order question regarding the importance of job-related reading/evaluating activities.

Figure 6. Importance of Job-related Reading Activities Question

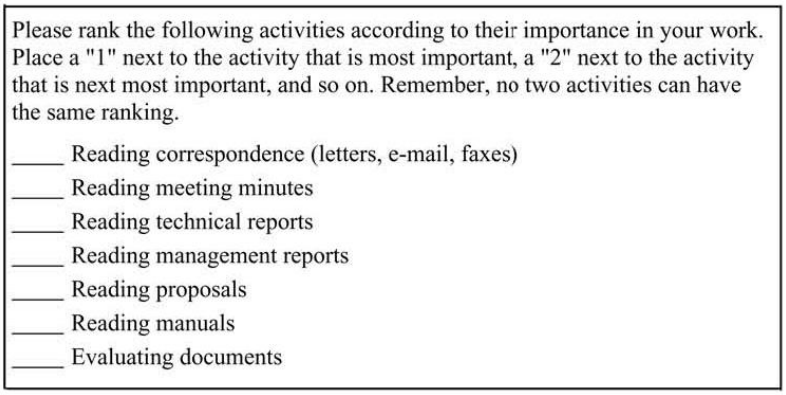


Table 2 provides the distribution of responses regarding importance of work-related reading or evaluating written communication materials. Table 3 indicates the statistical mean and standard deviation of responses regarding importance of work-related reading activities. In tabulating the data, participant responses were scored from 1 to 7 (highest ranking = 1; lowest ranking = 7).

Table 2. Importance of Work-related Reading Activities Percentage Responses

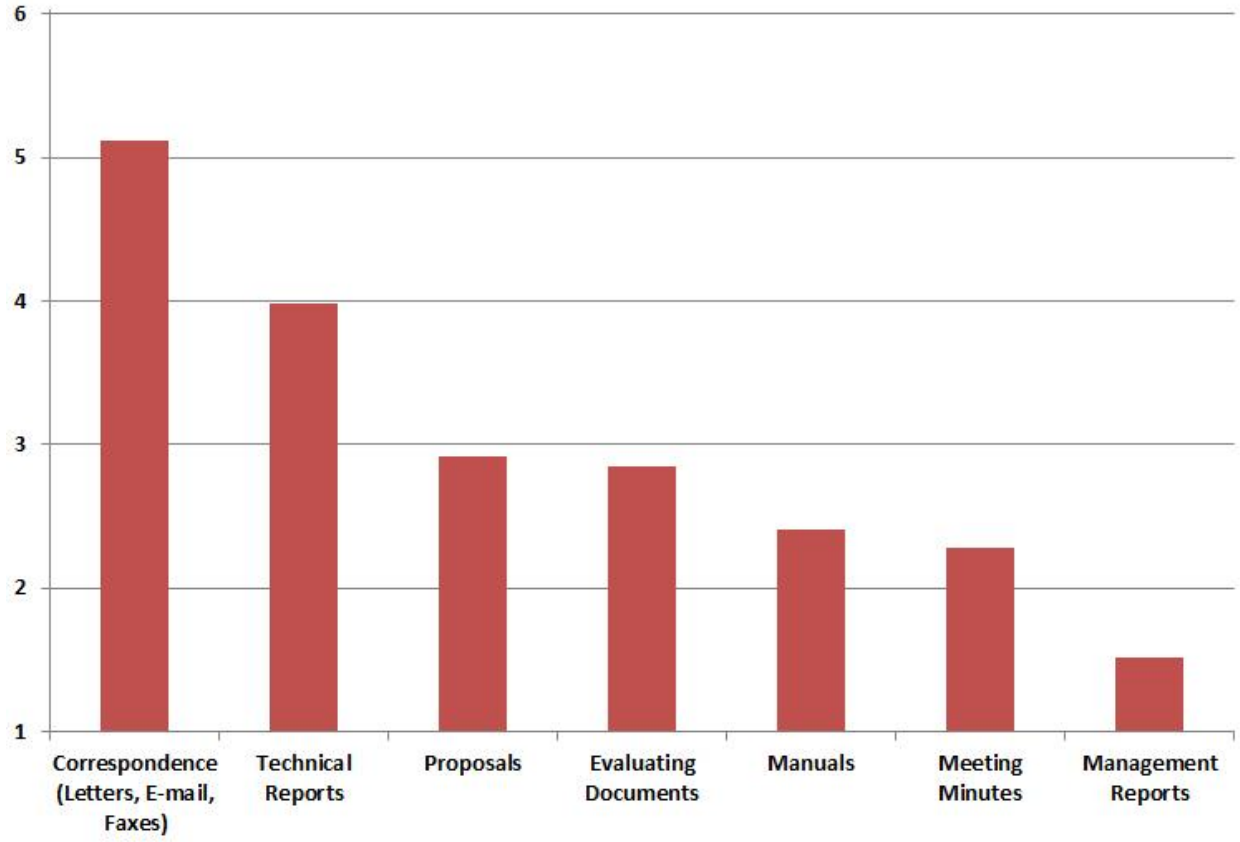
Answer	1	2	3	4	5	6	7	Responses
Reading correspondence (letters, e-mail, faxes)	61.3	17.7	7.2	6.1	2.8	3.3	1.7	181
Reading meeting minutes	0.0	13.0	11.3	18.1	24.9	13.6	19.2	177
Reading technical reports	17.7	23.2	23.8	19.9	7.2	7.2	1.1	181
Reading management reports	1.1	7.9	5.1	7.9	15.2	30.9	32.0	178
Reading proposals	6.7	18.5	15.2	16.3	16.9	18.0	8.4	179
Reading manuals	4.4	9.4	19.4	13.9	15.0	17.2	20.6	180
Evaluating documents	9.5	11.2	18.4	17.9	17.9	8.9	16.2	179

Table 3. Importance of Work-related Reading Activities Statistical Responses

Statistic	Reading correspondence (letters, e-mail, faxes)	Reading meeting minutes	Reading technical reports	Reading management reports	Reading proposals	Reading manuals	Evaluating documents
Mean	1.88	4.72	3.02	5.49	4.08	4.59	4.15
Standard Deviation	1.46	1.63	1.50	1.59	1.81	1.82	1.86

Figure 7 graphically illustrates the mean rank responses regarding the importance of work-related reading activities. For comparison, participant responses were scored from 1 to 7 (lowest ranking = 1; highest ranking = 7).

Figure 7. Work-related Reading Activities Importance Mean Rank Responses

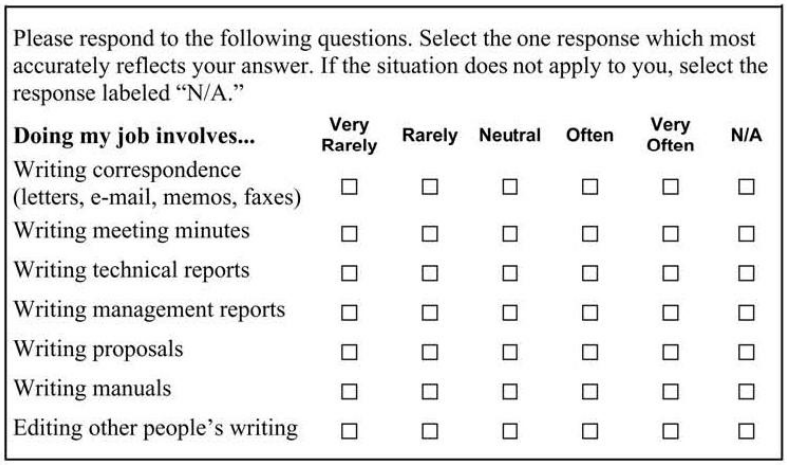


Concerning time spent reading or evaluating technical written communications, architects and professional engineers on average spend the most amount of time reading correspondence such as letters, e-mails, and faxes, and the least amount of time reading management reports. Respondents also indicated that they evaluate documents and read technical reports "often" and "very often." Regarding their perceptions of the relative importance of these activities in supporting or meeting their professional objectives, architects and professional engineers considered correspondence to be the most important when compared to other reading activities and ranked evaluating documents below reading technical reports and proposals.

Regarding time spent writing or editing technical written communications, respondents were asked to answer questions about frequency of writing six different document types (correspondence, meeting minutes, technical reports, management reports, proposals, and manuals) and frequency of editing other people's writing. Each question was answered with Likert scale responses ranging from "Very

Rarely" to "Very Often." Figure 8 shows the Likert scale questions concerning job-related writing/editing activities.

Figure 8. Frequency of Job-related Writing/Editing Communications Questions



Please respond to the following questions. Select the one response which most accurately reflects your answer. If the situation does not apply to you, select the response labeled "N/A."

Doing my job involves...	Very Rarely	Rarely	Neutral	Often	Very Often	N/A
Writing correspondence (letters, e-mail, memos, faxes)	☐	☐	☐	☐	☐	☐
Writing meeting minutes	☐	☐	☐	☐	☐	☐
Writing technical reports	☐	☐	☐	☐	☐	☐
Writing management reports	☐	☐	☐	☐	☐	☐
Writing proposals	☐	☐	☐	☐	☐	☐
Writing manuals	☐	☐	☐	☐	☐	☐
Editing other people's writing	☐	☐	☐	☐	☐	☐

Table 4 provides the distribution of participant responses regarding frequency of work-related writing or editing written communication materials. The mean and standard deviation is also presented with participant responses scored from 1 to 5 ("Very Rarely" = 1; "Very Often" = 5).

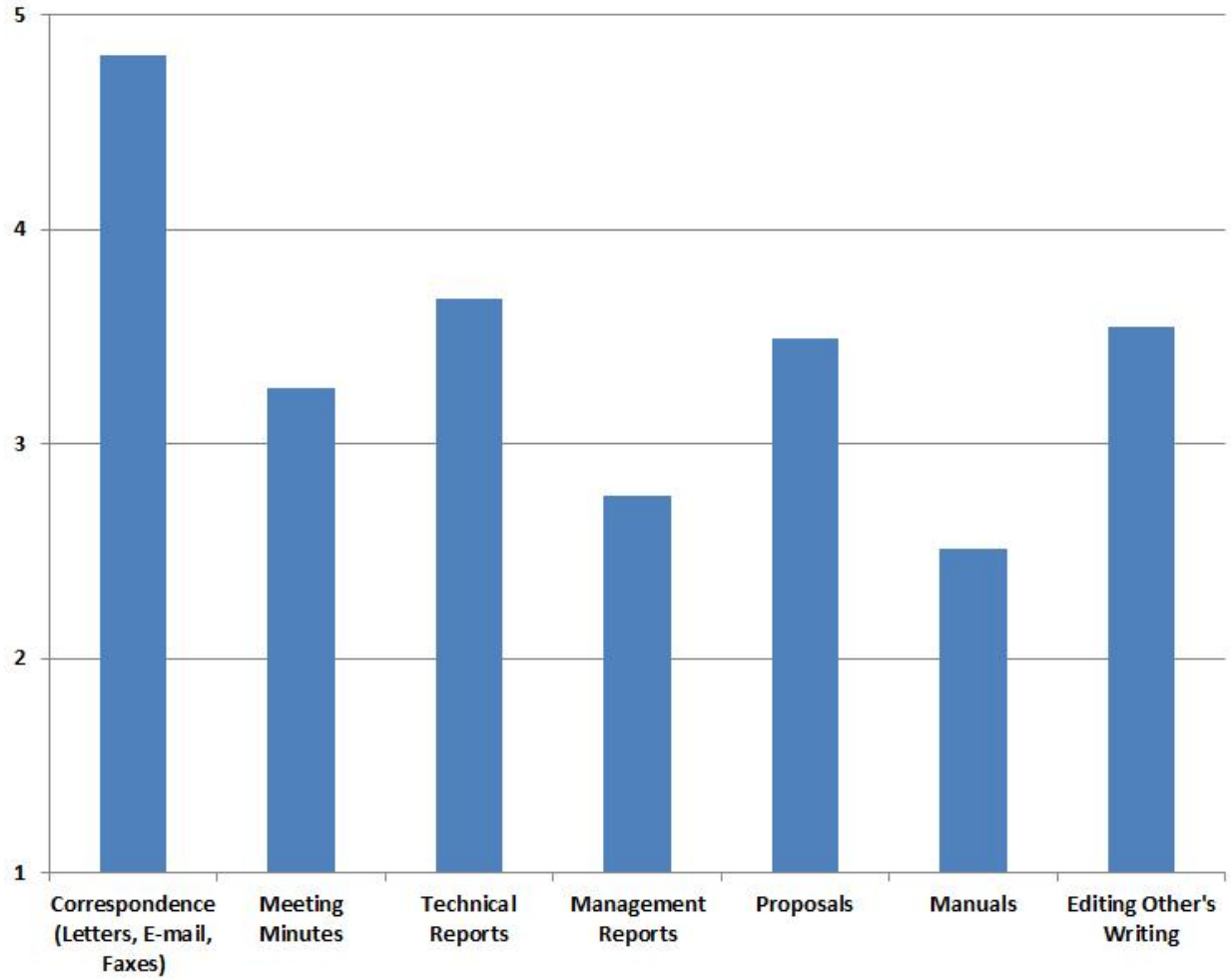
Table 4. Importance of Work-related Writing/Editing Activities Percentage Responses

Question	Very Rarely	Rarely	Neutral	Often	Very Often	Mean	Std. Dev.	Responses
Writing correspondence (letters, e-mail, memos, faxes)	0.0	1.1	1.6	12.6	84.7	4.83	0.49	183
Writing meeting minutes	10.5	18.6	22.7	31.4	16.9	3.29	1.24	172
Writing technical reports	3.3	14.4	21.0	33.7	27.6	3.73	1.11	181
Writing management reports	16.7	27.4	28.0	19.6	8.3	2.74	1.19	168
Writing proposals	7.5	15.6	22.5	28.9	25.4	3.49	1.24	173
Writing manuals	24.8	29.7	23.0	14.5	7.9	2.48	1.21	165
Editing other people's writing	8.9	8.9	26.3	30.7	25.1	3.58	1.22	179

A repeated measures analysis of variance was used to test the equality of mean responses on the frequency that respondents spend on the seven variables related to writing/editing communications. The means were found to be significantly different ($F = 84.55$, $p < .0001$). Tukey's multiple comparison test reveals that respondents spend significantly more time writing correspondence than any other

document types. Figure 9 graphically illustrates the means for participant responses regarding frequency of work-related writing or editing written communication materials. In tabulating the data, participant responses were scored from 1 to 5 ("Very Rarely" = 1; "Very Often" = 5).

Figure 9. Writing/Editing Questions Mean Likert Responses



Respondents were next asked to indicate their perceptions concerning the relative importance spent writing and editing technical written communications. In this question, respondents were asked to rank order writing six different document types (correspondence, meeting minutes, technical reports, management reports, proposals, and manuals) and editing other people's writing in relation to the importance of their work. Figure 10 shows the rank order question regarding the importance of job-related writing/editing activities.

Figure 10. Importance of Job-related Writing Rank Order Question

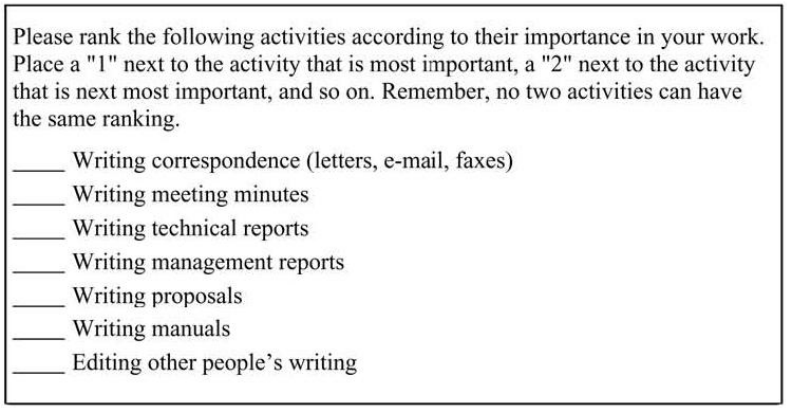


Table 5 provides the distribution of responses regarding importance of work-related writing or editing written communication materials. Table 6 indicates the statistical mean and standard deviation of responses regarding importance of work-related writing/editing activities. In tabulating the data, participant responses were scored from 1 to 7 (highest ranking = 1; lowest ranking = 7).

Table 5. Importance of Work-related Writing/Editing Activities Percentage Responses

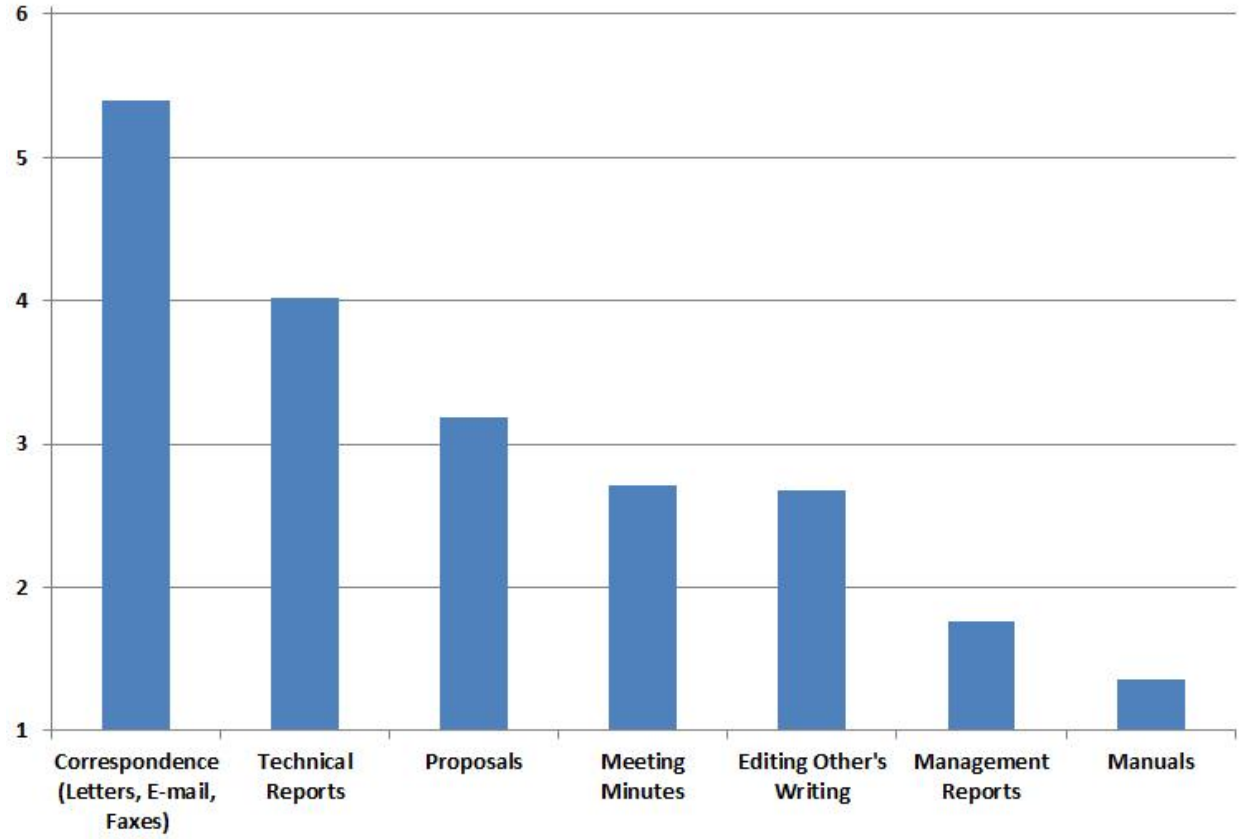
Answer	1	2	3	4	5	6	7	Responses
Writing correspondence (letters, e-mail, faxes)	67.4	16.0	9.9	3.9	1.1	1.1	0.6	181
Writing meeting minutes	0.0	19.0	16.2	20.7	19.6	10.6	14.0	179
Writing technical reports	22.2	25.0	19.4	11.1	11.1	10.0	1.1	180
Writing management reports	1.1	7.3	6.8	11.3	22.0	27.7	23.7	177
Writing proposals	7.8	19.4	18.3	18.3	15.6	15.0	5.6	180
Writing manuals	0.0	3.4	7.3	12.4	14.6	23.6	38.8	178
Editing other people's writing	2.2	11.1	22.8	22.2	15.6	10.6	15.6	180

Table 6. Importance of Work-related Writing/Editing Activities Statistical Responses

Statistic	Writing correspondence (letters, e-mail, faxes)	Writing meeting minutes	Writing technical reports	Writing management reports	Writing proposals	Writing manuals	Editing other people's writing
Mean	1.61	4.28	2.98	5.24	3.82	5.64	4.32
Standard Deviation	1.09	1.65	1.67	1.55	1.70	1.45	1.66

Figure 11 graphically illustrates the mean rank responses regarding the importance of work-related writing/editing activities. For comparison, participant responses were scored from 1 to 7 (lowest ranking = 1; highest ranking = 7).

Figure 11. Importance of Work-related Writing/Editing Activities Mean Rank Responses

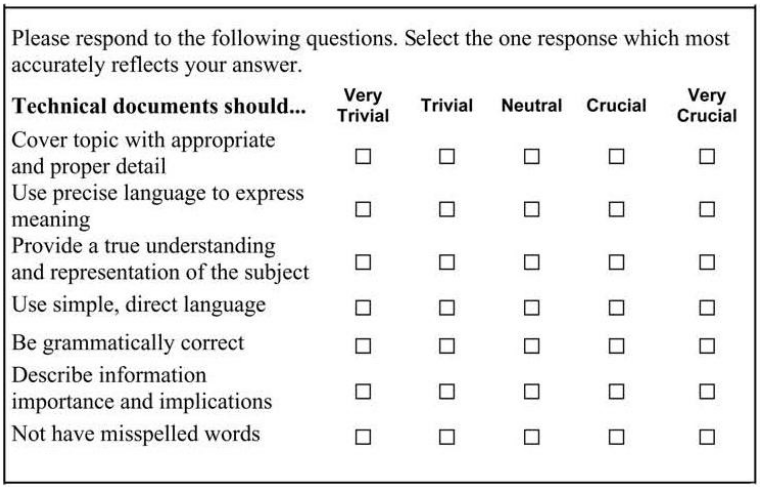


Concerning time spent writing and editing technical written communications, architects and professional engineers spend the most amount of time writing correspondence such as letters, e-mails, and faxes, closely followed by nearly equal time spent writing technical reports and proposals and editing other people's writing. Regarding their perceptions of the relative importance of these activities in supporting or meeting their professional objectives, architects and professional engineers considered correspondence to be the most important when compared to other writing activities in their work. Writing technical reports and proposals were ranked second and third, respectively, with manuals rating the lowest level of importance.

Regarding specific quality characteristics of technical written communications, respondents were asked to answer questions about the need for seven aspects (completeness, stylistic accuracy, technical accuracy, appropriateness, conciseness, correct grammar, and spelling) in technical documents. Each question was answered with Likert scale responses ranging from "Very Trivial" to "Very Crucial." Figure

12 shows the Likert scale questions concerning specific quality characteristics for technical communications.

Figure 12. Technical Documents Quality Characteristics Questions



Please respond to the following questions. Select the one response which most accurately reflects your answer.

Technical documents should...	Very Trivial	Trivial	Neutral	Crucial	Very Crucial
Cover topic with appropriate and proper detail	☐	☐	☐	☐	☐
Use precise language to express meaning	☐	☐	☐	☐	☐
Provide a true understanding and representation of the subject	☐	☐	☐	☐	☐
Use simple, direct language	☐	☐	☐	☐	☐
Be grammatically correct	☐	☐	☐	☐	☐
Describe information importance and implications	☐	☐	☐	☐	☐
Not have misspelled words	☐	☐	☐	☐	☐

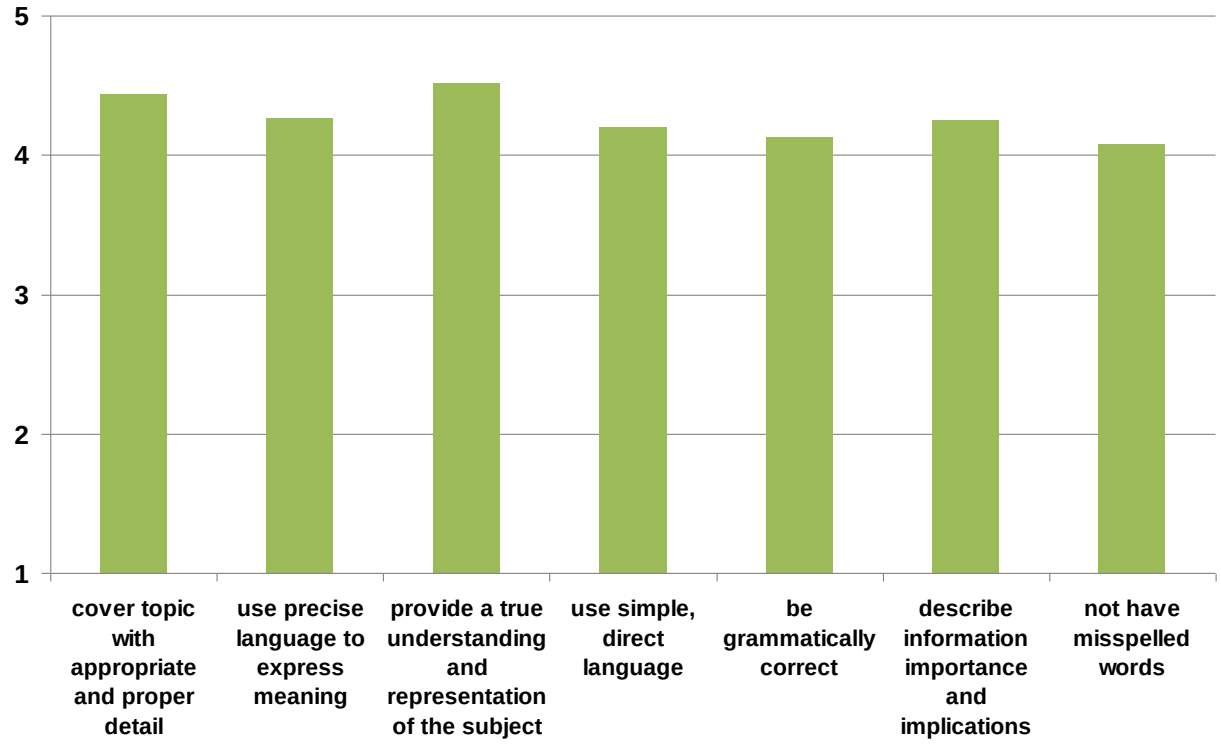
Table 7 provides the distribution of responses regarding quality characteristics of technical documents. The mean and standard deviation is also presented with participant responses scored from 1 to 5 ("Very Rarely" = 1; "Very Often" = 5).

Table 7. Quality Characteristics of Technical Documents Percentage Responses

Question	Very Trivial	Trivial	Neutral	Crucial	Very Crucial	Mean	Std. Dev.	Responses
Cover topic with appropriate and proper detail	0.0	0.6	5.0	44.2	50.3	4.45	0.61	181
Use precise language to express meaning	0.0	0.5	13.2	45.1	41.2	4.27	0.70	182
Provide a true understanding and representation of the subject	0.0	0.0	2.2	43.7	54.1	4.52	0.54	183
Use simple, direct language	0.0	0.6	14.4	49.2	35.9	4.21	0.70	181
Be grammatically correct	0.0	2.2	16.3	47.8	33.7	4.13	0.76	184
Describe information importance and implications	0.0	1.1	11.0	49.5	38.5	4.23	0.73	182
Not have misspelled words	0.0	3.8	19.8	41.2	35.2	4.06	0.86	182

A repeated measures analysis of variance was used to test the equality of mean importance for the different quality characteristics of technical documents. The means were found to be significantly different ($F = 14.33$, $p < .0001$). Tukey's multiple comparison test reveals that respondents think "providing a true understanding and representation of the subject" is significantly more important than all other quality characteristics of technical documents except "covering a topic with appropriate and proper detail." Figure 13 graphically illustrates the means for participant responses regarding quality characteristics of technical documents. In tabulating the data, participant responses were scored from 1 to 5 ("Very Rarely" = 1; "Very Often" = 5).

Figure 13. Quality Characteristics for Technical Documents Mean Likert Responses



Respondents were next asked to indicate their perceptions concerning the relative value of the quality characteristics for effective technical communication. In this question, respondents were asked to rank order the importance of seven quality aspects (completeness, stylistic accuracy, technical accuracy, appropriateness, conciseness, correct grammar, and spelling) in relation to the effectiveness of technical documents. Figure 14 shows the rank order question regarding the importance of specific quality characteristics for effective technical communication.

Figure 14. Importance of Job-related Writing Rank Order Question

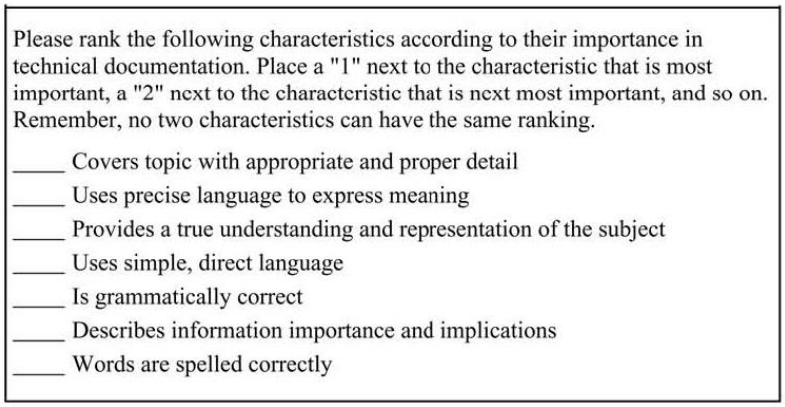


Table 8 provides the distribution of responses regarding importance of regarding the importance of the seven quality characteristics for effective technical communication. Table 9 indicates the statistical mean and standard deviation of responses regarding the importance of the seven quality characteristics for effective technical communication. In tabulating the data, participant responses were scored from 1 to 7 (highest ranking = 1; lowest ranking = 7).

Table 8. Importance of Quality Characteristics Percentage Responses

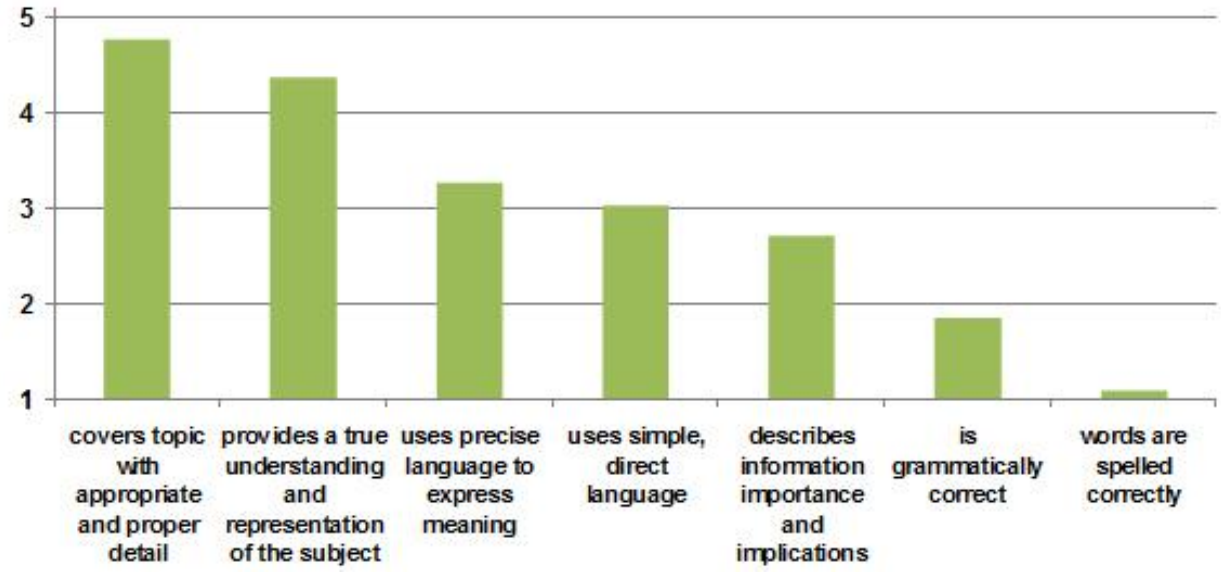
Answer	1	2	3	4	5	6	7	Responses
Covers topic with appropriate and proper detail	50.5	15.9	13.2	8.2	4.9	5.5	1.6	182
Uses precise language to express meaning	6.1	18.2	15.5	30.9	18.8	6.1	4.4	181
Provides a true understanding and representation of the subject	23.9	32.2	21.1	9.4	7.2	4.4	1.7	180
Uses simple, direct language	8.8	10.5	17.7	22.1	24.3	11.6	5.0	181
Is grammatically correct	3.3	7.1	4.4	8.8	20.3	45.6	10.4	182
Describes information importance and implications	2.2	12.7	22.7	16.6	19.9	13.8	12.2	181
Words are spelled correctly	5.5	4.4	5.5	3.9	3.9	12.7	64.1	181

Table 9. Importance of Quality Characteristics Statistical Responses

Statistic	Covers topic with appropriate and proper detail	Uses precise language to express meaning	Provides a true understanding and representation of the subject	Uses simple, direct language	Is grammatically correct	Describes information importance and implications	Words are spelled correctly
Mean	2.24	3.74	2.64	3.97	5.14	4.29	5.91
Standard Deviation	1.63	1.48	1.49	1.60	1.52	1.65	1.85

Figure 15 illustrates the mean rank responses (least important = 1; most important = 7) regarding the importance of the seven quality characteristics for effective technical communication. For comparison, participant responses were scored from 1 to 7 (lowest ranking = 1; highest ranking = 7).

Figure 15. Importance of Quality Characteristics Mean Rank Responses



Regarding specific quality characteristics (completeness, stylistic accuracy, technical accuracy, appropriateness, conciseness, grammar, and misspellings) considered in evaluating technical documents architects and professional engineers thought it is “very crucial” for a technical document to provide a true understanding and representation of the subject and to cover the topic with appropriate and proper detail. Concerning their perceptions of the relative value of the quality characteristics for effective technical communication, respondents valued mechanical issues such as spelling and grammatical correctness as the two least important aspects of a technical document. On the other hand,

respondents rated organization, comprehensiveness, and accuracy as the most important aspects of a technical document.

Conclusion

One purpose of post-secondary education is to prepare students to effectively plan and write a range of informative and persuasive documents essential to their professional careers. Engineering and technical communication curricula emphasis should help students understand and develop specific professional writing skills. Students expect that what the instructor focuses on in the classroom will also apply to their workplace writing. This requires close parity between what professors teach and what practitioners find important. This study has revealed interesting results regarding the perceptions of time spent by architects and professional engineers for reading, writing, and evaluating various information products, as well as their perspectives of specific quality characteristics and the relative significance in meeting work goals.

What we learned from this descriptive cross-sectional research study suggests the primary pedagogical emphasis for engineering and technical communication curricula should be job-related correspondence, followed closely by technical reports and proposals. By comparison, less attention could be directed at the genre of writing instructional materials such as manuals. Finally, developing rhetorical strategies for focusing attention on audience and purpose to plan well-organized and comprehensive written communications should be considered more important than concentrating on style, grammar, and other mechanical writing/editing competencies.

An ethnographic study is needed to assess post-secondary educators' perceptions of writing quality and how it may be affected by pedagogical influence. However, the results of this study may assist educators to relate more closely with industry expectations and decide whether curricula emphasis should be revised based on feedback from engineering and architecture practitioners. Educators may find such definitive information useful in defining objectives, planning curricula, and determining specific course criteria for developing engineering and technical writing program.

A secondary aspect of this research is to clarify perceptions regarding the importance of specific quality characteristics for information products. Communication practitioners may also consider the value of various aspects as perceived by their colleagues helpful when making strategic decisions to creat or enhance information products.

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Appendix A: Survey Instrument
(First Page)

Consent Information

Your participation in a research endeavor is requested. All seminar attendees are invited to participate.

The survey asks about your opinions and experiences with professional communication activities and technical documentation. The research is designed to examine the perspectives of working professionals regarding business communication activities and information products. Your feedback will be used to improve presentations for future attendees.

The survey should take about 15 minutes. Please complete the entire survey at one time, without interruption.

Please note that your responses will be used for research purposes only and will be strictly confidential. Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law.

You are not waiving any legal claims, rights or remedies because of your participation. If you have questions or comments about the survey, please contact Don Cunningham at dacunning@radford.edu.

I understand that:

- My participation is completely voluntary.
- I am free to withdraw my consent and exit the survey at any time.
- I am not required to provide any information that I do not wish to.
- The risks in this study are not greater than those encountered in everyday life.
- There is no direct benefit to me for participating in this study.

If you are willing to participate, kindly complete the survey form and return it to the site coordinator.

If you have any questions or concerns about this research, please contact Dr. Cunningham at this address:

Dr. Don Cunningham
Radford University
P. O. Box 6935
Radford, VA 24142

Survey Instrument
(Second Page)

Please respond to the following questions. Select the one response which most accurately reflects your answer. If the situation does not apply to you, select the response labeled "N/A."

Doing my job involves...	Very Rarely	Rarely	Neutral	Often	Very Often	N/A
Reading correspondence (letters, e-mail, faxes)	☐	☐	☐	☐	☐	☐
Reading meeting minutes	☐	☐	☐	☐	☐	☐
Reading technical reports	☐	☐	☐	☐	☐	☐
Reading management reports	☐	☐	☐	☐	☐	☐
Reading proposals	☐	☐	☐	☐	☐	☐
Reading manuals	☐	☐	☐	☐	☐	☐
Evaluating documents	☐	☐	☐	☐	☐	☐

Please rank the following activities according to their importance in your work. Place a "1" next to the activity that is most important, a "2" next to the activity that is next most important, and so on. Remember, no two activities can have the same ranking.

_____ Reading correspondence (letters, e-mail, faxes)
_____ Reading meeting minutes
_____ Reading technical reports
_____ Reading management reports
_____ Reading proposals
_____ Reading manuals
_____ Evaluating documents

Please respond to the following questions. Select the one response which most accurately reflects your answer. If the situation does not apply to you, select the response labeled "N/A."

Doing my job involves...	Very Rarely	Rarely	Neutral	Often	Very Often	N/A
Writing correspondence (letters, e-mail, memos, faxes)	☐	☐	☐	☐	☐	☐
Writing meeting minutes	☐	☐	☐	☐	☐	☐
Writing technical reports	☐	☐	☐	☐	☐	☐
Writing management reports	☐	☐	☐	☐	☐	☐
Writing proposals	☐	☐	☐	☐	☐	☐
Writing manuals	☐	☐	☐	☐	☐	☐
Editing other people's writing	☐	☐	☐	☐	☐	☐

Survey Instrument
(Third Page)

Please rank the following activities according to their importance in your work. Place a "1" next to the activity that is most important, a "2" next to the activity that is next most important, and so on. Remember, no two activities can have the same ranking.

_____ Writing correspondence (letters, e-mail, faxes)
_____ Writing meeting minutes
_____ Writing technical reports
_____ Writing management reports
_____ Writing proposals
_____ Writing manuals
_____ Editing other people's writing

Please respond to the following questions. Select the one response which most accurately reflects your answer.

Technical documents should...	Very Trivial	Trivial	Neutral	Crucial	Very Crucial
Cover topic with appropriate and proper detail	☐	☐	☐	☐	☐
Use precise language to express meaning	☐	☐	☐	☐	☐
Provide a true understanding and representation of the subject	☐	☐	☐	☐	☐
Use simple, direct language	☐	☐	☐	☐	☐
Be grammatically correct	☐	☐	☐	☐	☐
Describe information importance and implications	☐	☐	☐	☐	☐
Not have misspelled words	☐	☐	☐	☐	☐

Please rank the following characteristics according to their importance in technical documentation. Place a "1" next to the characteristic that is most important, a "2" next to the characteristic that is next most important, and so on. Remember, no two characteristics can have the same ranking.

_____ Covers topic with appropriate and proper detail
_____ Uses precise language to express meaning
_____ Provides a true understanding and representation of the subject
_____ Uses simple, direct language
_____ Is grammatically correct
_____ Describes information importance and implications
_____ Words are spelled correctly

Survey Instrument
(Fourth Page)

Please note any additional comments in the space below:

_____

_____

_____

_____

_____

_____

_____

_____

Please indicate your gender by checking the appropriate box below:

- ☐ Male
- ☐ Female

Please indicate your age range by checking the appropriate box below:

- ☐ Less than 30 years old
- ☐ 30 to 39 years old
- ☐ 40 to 49 years old
- ☐ 50 to 59 years old
- ☐ More than 60 years old

Please indicate your occupation by checking the appropriate box below:

- ☐ Professional Engineer
- ☐ Professional Architect
- ☐ Manager/Supervisor
- ☐ Other (Please specify) _____