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ABSTRACT

In a study of the relationship between the writing habits and productivity of technical writers, 127 science and engineering professors were surveyed concerning the number of technical articles, books, proposals, and reports they had produced over a three-year period and about their writing habits. Specifically, they were asked questions about the scheduling of work sessions, the environment they used for writing, the tools they used for composing and editing, the cognitive strategies they used to cope with attentional demands of writing, and the frame of mind they needed for writing (or the rituals used to achieve that state). Multiple regression analysis revealed that productive technical writers used particular (1) tools, such as a dictaphone; (2) cognitive strategies, such as constructing detailed written outlines; (3) frames of mind, such as vigorous exercise before writing; (4) environments, such as background music; and (5) work scheduling, such as writing for periods of one to two hours. Findings indicated that, by far, the use of a dictaphone was the variable most strongly related to productivity. (Author/FL)

Writing Habits and Productivity in Technical Writing

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Abstract

The relationship between the writing habits and productivity of technical writers was investigated. Science and engineering faculty members (n = 127) were surveyed regarding the number of technical articles, books, proposals, and reports that they produced over a three year period and about their writing habits. The latter involved questions about the scheduling of work sessions, the environment used for writing, the tools used for composing and editing, the cognitive strategies used to cope with attentional demands of writing, and the frame of mind needed for writing (or the rituals used to achieve such a state). Multiple regression analysis was used to account for variance in total productivity in terms of writing habits. The results showed that productive technical writers use particular tools (e.g., composing and editing with a dictaphone), cognitive strategies (e.g., constructing detailed written outlines), frames of mind (e.g., exercising vigorously before writing), environments (e.g., listening to background music), and work scheduling (e.g., writing for periods of one to two hours). By far, the use of a dictaphone was most strongly related to productivity.

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Writing Habits and Productivity in Technical Writing

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Writing is an extraordinarily complex human activity. It involves creating ideas, remembering, planning, reading, and, of course, language production. I am certain that many technical writers would agree with the sentiments expressed by the novelist James Jones when he said, according to an article in the St. Louis Post-Dispatch: "I hate writing. I love having written." In this paper, I briefly relate why a survey of technical writers was conducted, what my expectations were regarding productivity and writing habits, some details about the method, and, finally, the relationships obtained between productivity and writing habits.

First, the why question. Technical writing, broadly defined here as any writing done in the context of office work, is an ideal problem for research. It is a highly frequent task. Moreover, it is an important task. The amount and quality of text produced by a worker determines, in part, both individual and organizational success. This is so true for college professors that the slogan "publish or perish" has become a trademark of the profession. Despite the frequency and importance of technical writing, a review of the literature revealed only a few studies that have dealt with the process of writing among professionals (Boice, in press; Gould, 1981; Lowenthal and Wason, 1977; Rosenberg and Lah, 1982).

The purpose of the present survey was to identify writing habits that correlate with productivity in technical writing. In deciding what to ask authors, I viewed the writer and everything that he or she uses to produce text as a person-machine system. The chief components of this system fall into the following five categories: the scheduling of writing sessions, the environment used for writing, the tools used for composing and editing, the cognitive strategies used to cope with the attentional demands of composing and editing, and the frame of mind needed for writing (i.e., the rituals used to achieve such a state). Of course, each of these categories contains numerous elements. Work scheduling, for example, includes what hours of the day the person writes, how long, and how regularly.

Before delving into the details of what I asked about writing habits, I wish to discuss my expectations about the outcome. Productivity was defined here in terms of the number of journal articles, technical reports, technical books, and grant-related reports written by a faculty member over the past three years. What writing habits might be expected to correlate with productivity?

First, what hours a writer works seemed unimportant as long as she does so regularly. Therapists have reported success in treating professionals who complain of "writer's block" through programs that reward regular writing (Boice, in press; Rosenberg and Lah, 1982). Thus, I expected a correlation between regularity of writing and productivity.

Second, I doubted that the environment selected for writing--the location, the lighting, the seating, and the background noise--would be critical. Wide individual differences among productive writers were expected. The one exception to this generalization was with regard to noise; productive writers may choose quiet environments, with nothing more than the hum of the ventilation system to disturb them.

Third, colleagues who compose and edit with dictaphones and text editors tell me that such tools are more efficient than are pens and typewriters. Not surprisingly, the manufacturers of dictaphones and text editors tell me the same thing. However, Gould (1978; 1982) reported that experienced executives compose one page letters in long hand only slightly slower than they dictate them and actually faster than they type them on a text editor. A secretary may save time in typing dictated material (depending on the legibility of the executive's handwriting) and need not type at all material composed on a text editor. But Gould's results suggest that the executive gains little, if anything, through the use of such machines. It may be, though, that the advantages claimed by proponents of dictaphones and text editors emerge on article-length manuscripts, not on short letters. I anticipated, therefore, that productivity would be affected by the type of tools used by the writer.

Fourth, Flower and Hayes (1980), among others, have emphasized the large number of processes that are simultaneously competing for a writer's attention. Generating ideas, organizing ideas, setting goals, translating ideas into text, reading the result, and editing as needed place a serious strain on attention. Poor cognitive strategies for handling this overload may lead to a fatigued, frustrated, and unproductive writer. For example, Green and Wason (1982) argued that attempting to compose a perfect first or second draft--that is, to plan everything mentally before sitting down to write--is too difficult and distasteful. If one dislikes writing a great deal, then it is reasonable to expect productivity to suffer. Thus, I expected that the writer's approach to first drafts, and other cognitive strategies, should affect productivity.

Finally, I expected large individual differences in the frame of mind needed for writing. Whereas one professor may write best when he is under pressure from his collaborators, another may wilt under such pressure. Whereas one may do best after a relaxing workout at the gym, another may prefer to drink several cups of coffee.

Method

Science and Engineering faculty on the St. Louis, Columbia, and Rolla campuses of the University of Missouri were surveyed. The science departments included were geology, biology, chemistry, physics, computer science, mathematics, psychology, and economics. The engineering departments surveyed were agricultural, chemical, civil, electrical, mechanical, mining, geological, aerospace, nuclear, and management engineering. All members of the selected departments received a questionnaire. A total of 512 questionnaires were sent out and 127 were returned, representing a 25% return rate. Respondents were anonymous.

The questionnaire consisted of 65 items concerned with work habits and four with productivity. Each question on work habits assessed how often the person engaged in a particular habit. For example, the writer rated on a 7 point scale ranging from 1 (never) to 7 (always) how often he used a typewriter in composing a draft. The productivity questions asked for a numerical estimate of the number of technical manuscripts written in the past three years.

The category of work scheduling was represented by one item on regularity of writing, five items on the length of writing sessions, and six items on the hours of the day used for writing. The environment category involved three items on where the person wrote, three on lighting, six on noise, and three on seating charcteristics. Four questions were asked about tools used in composing and four about editing tools. Concerning cognitive strategies, seven items probed planning at various levels of text structure during composition (e.g., planning clauses versus paragraphs). Two items each concerned the use

and degree of detail of mental and written outlines. Finally, two questions probed the use of a perfect draft strategy. The category of frame of mind was represented by six items on physical activities (e.g., walking outside), five on beverages consumed, and five on sources of pressure to write (e.g., pressure from administrators).

Results

Descriptive statistics on the four measures of productivity are shown in Table 1. Bear in mind that these values represent the number of manuscripts produced over a three year period. Total productivity represented the sum of the other four measures.

Stepwise multiple regression was conducted using the MAXR procedure of SAS, a computer analysis package. This approach to stepwise multiple regression determines which variable to enter into the equation at each step so as to maximize the amount of variance accounted for on that step. A separate analysis was conducted for each group of related items under each general category of work habits. For example, under work scheduling an analysis was performed on the five items related to length of work session. Total productivity served as the dependent variable in each case. A summary of these analyses is shown in Table 2.

Table 2 presents variables that yielded both a significant overall regression equation and a significant test of the variance accounted for by each particular variable. Individual differences dominated the outcome for work scheduling. Only the frequency with which respondents reported writing for one to two hours per session significantly related to productivity. Surprisingly, even the question concerning how often they write on a regular, everyday basis failed to predict productivity.

The analysis on noise yielded two significant variables. The more often writers reported working with stereo music and the noise of the ventilation system in the background, the more productive they tended to be. Seating in the environment was the only other significant factor, with the use of a stuffed office chair correlating with productivity.

Relative to the other categories, the type of tools used was clearly most important in accounting for variance in productivity. In the composing analysis, the use of a pen and, especially, a dictaphone, lead to high productivity. Especially impressive was the relationship between using a dictaphone for editing a rough draft and productivity. This variable alone accounted for about 26% of the variance in total productivity; for every unit on the scale of how often subjects used a dictaphone for editing, there was an increase of 11.58 units on the productivity scale. It should be noted that the use of text editors was uncorrelated with productivity.

With regard to cognitive strategies, only the items concerning the use and detail of written outlines were important. The regression coefficient (B) for doing a written outline before beginning the first draft was negative. As will be seen in a moment, this item was not significantly correlated with productivity; the negative B value emerged because of a suppression effect. Frequently writing an outline that was highly detailed did contribute to an increase in productivity. Contrary to expectations, the use of a perfect draft strategy was uncorrelated with productivity.

Finally, the analyses on the frame of mind questions suggest that productive writers often vigorously exercise and drink soft drinks before or during a writing session. As

an intriguing aside, I should mention that occasionally drinking alcohol while writing was correlated with the number of journal articles published, lending some credence to the adage that productive writers sometimes find inspiration in a bottle. But this outcome was not consistent across the other measures of productivity.

Finally, to determine how much variance in total productivity could be accounted for by taking into account all five categories of variables, I performed a stepwise multiple regression using the eleven variables previously identified as important. The outcome is shown in Table 3. The multiple R was .63 for the model that was significant overall and whose variables were each significant. Only six of the eleven variables met this criterion. These six variables, then, are most important in predicting productivity in the present sample.

Descriptive statistics for the six most important variables are shown in Table 4. It is interesting to note that the use of a dictaphone for editing was rare, with a mean and median response of 1 or never. Yet, despite it's rarity, it was highly correlated with productivity.

The correlation matrix for the selected, important variables and the dependent measure of total productivity is shown in Table 5. Looking along the bottom row, one can see that all of these factors were significantly correlated with productivity, with the exception of writing an outline before beginning. The strong positive correlation between outline and detail, the null correlation between outline and productivity, and the positive correlation between detail and productivity created a suppression effect in the multiple regression analysis on these variables. This suppression effect explains why the B value for the outline variable was negative.

Discussion

In summary, the results suggest that a technical writer interested in high productivity should be concerned primarily with tools, secondly with cognitive strategies, and thirdly, with frame of mind. Surprisingly, work scheduling and, not so surprisingly, environment were dominated by individual differences.

Concerning specific hypotheses, the survey failed to support the idea that a regular schedule for writing is vital for productivity. Although such scheduling may help those suffering from writer's block (Boice, in press; Rosenberg and Lah, 1982), it is apparently not a writing habit that is essential for high productivity.

Whereas a dictaphone emerged as a handy tool to have around, a text editor did not. This result is consistent with Gould's findings (1978; 1981). Even so, the present study does not permit a definitive conclusion about text editors and productivity. There are many types of text editors, but distinctions were not made in my questionnaire. The features of some types may aid productivity and the features of others may hinder productivity. Also, relative to other tools, text editors are a recent addition to the writer's tool box. The best techniques for using text editors are probably not well established.

Finally, writers who attempt to produce a perfect draft on the first or second try were just as productive as those who compose rough drafts. Adopting a perfect draft strategy may cause one to dislike writing (Green and Wason, 1982), but productivity does not suffer as a consequence. Interestingly, writing a highly detailed outline before beginning the first draft is a characteristic of productive writers. The attentional demands of composing a first draft may be attenuated when a clear plan for a manuscript

is developed during the prewriting stage. Further research is needed to determine precisely why detailed outlines are associated with high productivity.

What limitations are there in these results? First, they are correlational and exploratory, though they do suggest fruitful areas for experimental work on writing. Second, they say nothing of the relationship between writing habits and writing quality. I intentionally did not ask writers about the quality of their own work. Their judgments would obviously have been hard to accept on face value. Moreover, quality is a fuzzy concept that is difficult to measure even in another writer's work. Nonetheless, quality is as important as productivity and needs to be examined in future experimental work.

Table 1

Descriptive Statistics for Productivity Variables

Variable	Mean	Median	Mode	S.D.
Journal Articles[a]	7.02	6	6	5.52
Technical Reports[a]	3.17	3	0	3.95
Technical Books[b]	0.30	0	0	0.87
Grant Reports[a]	6.23	4	3	9.66
Total Productivity[b]	16.82	14	12	14.06

[a]N = 126; [b]N = 125

Table 2

Summary of Stepwise Multiple Regression Analyses for Total Productivity

Variables	B	R	R^2	p
		Work Scheduling		
One to two hours	2.30	.22	.05	.05
		Environment		
Stereo Background Music	1.76	.30	.09	.01
Ventilation Background Noise	1.66			
Stuffed Office Chair	1.29	.19	.04	.05
		Tools		
Pen for Composing	2.65	.43	.18	.001
Dictaphone for Composing	4.71			
Dictaphone for Editing	11.58	.51	.26	.001
		Cognitive Strategies		
Write Outline Before Beginning	-2.51	.38	.14	.001
Detail of Written Outline	3.70			
		Frame of Mind		
Drink Soft Drinks	1.97	.33	.11	.01
Exercise Vigorously	1.86			

Table 3

Best Model for Predicting Total Productivity

Variable	B	F	p
Stuffed Office Chair	1.05	3.52	.07
Stereo Background Music	1.57	4.33	.05
Dictaphone for Editing	9.57	20.62	.001
Write Outline Before Beginning	-2.50	9.65	.01
Detail of Written Outline	2.66	10.41	.01
Exercise Vigorously	1.58	4.28	.05

Note. Intercept = -4.17, $R = .63$, $R^2 = .40$, $F(6,92) = 10.35$, $p < .001$, for the overall best model.

Table 4

Descriptive Statistics for Selected Measures of Writing Habits

Variable	Mean	Median	Mode	S.D.
Stuffed Office Chair	4.76	5	7	2.13
Stereo Background Music	2.35	2	1	1.63
Dictaphone for Editing	1.15	1	1	0.63
Write Outline Before Beginning	4.84	5	7	1.97
Detail of Written Outline	3.59	3.5	4	1.86
Exercise Vigorously	2.21	1	1	1.65

Note. The scale ranged from 1 (Never) to 7 (Always).

Table 5

Correlation Matrix for Measures of Writing Habits and Productivity

	Chair	Music	Dictaphone	Outline	Detail	Exercise	Productivity
Chair	1.00						
Music	-.06	1.00					
Dictaphone	.04	.04	1.00				
Outline	-.18*	.17	.07	1.00			
Detail	-.03	.18	.16	.61***	1.00		
Exercise	-.05	.24*	.00	.20*	.21*	1.00	
Productivity	.18*	.19*	.50***	-.04	.27**	.23*	1.00

* $p < .05$, ** $p < .01$, *** $p < .001$

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