

A PRAGMATIC APPROACH TO GRADING STUDENT REPORTS

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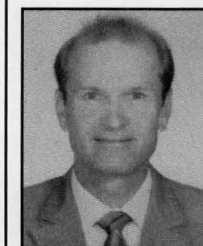
The average professor must evaluate, or enlist the help of others in evaluating, a great number of report assignments written by students. How can that professor arrive at a grade rapidly, objectively, and reproducibly? The following offers a pragmatic and proven solution to this problem.

Evaluating technical texts is a dynamic task and no single method for doing so can be perfect. All professors challenge students in their own particular and personalized way, and through the years they find that their grading methods change and improve as new procedures appear in the literature and become known. In order to become involved in the quest for improved grading methods, some crucial questions must first be answered:

- *Is report writing considered an essential part of engineering apprenticeship?*
- *Is enough time taken in teaching students how to write a report and check the feedback, or is the teaching assistant left to struggle along on his own?*
- *How objective is the professor when evaluating a report?*
- *Can the same mark for the same report be arrived at both today and a month from now?*
- *Is flawless composition required, or are the calculations the only thing that matter?*

Arriving at a report grade can be as fascinating as a chess

My basic premise is that the grading system must be corrective, instructive, and simple. I have extracted ideas from all of the known methods and have added other, specific, items that apply to the learning process . . .



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game. The grader tests the writer as much as the writer probes the grader. The various methods used to evaluate technical writing have been explored by Plung,^[1] but they are not suitable for the case at hand. They evaluate only continuous text and require rewriting to arrive at a score, whereas the reports we are dealing with contain text, figures, calculations, appendices, and nomenclature, and the number of assignments as well as the time pressure do not allow for rewriting.

My basic premise is that the grading system must be corrective, instructive, and simple. I have extracted ideas from all of the known methods and have added other, specific, items that apply to the learning process, with the result that over the years a pragmatic scoresheet has evolved which is effective in generating good-quality reports.

SCORING GUIDE

A basic scoring guide is presented in Table 1. It addresses all the basic items that contribute to the quality of a report: efficiency or timeliness, overall presentation, quality of editing, technical level, and quality of calculations, tables, and figures.

It is essential that the students become familiar with the scoring guide before writing their reports. This is the instructive aspect of the method since the students can calculate their own grades and improve them at will before submitting the report. The method's corrective side comes from the fact

that the basic items failed or violated are clearly stated, and the students are challenged to refine and improve their presentation.

The grader assigns either a "1" or a "0" to each item on the scoring guide, according to whether or not it has been satisfied. Items that are not applicable receive a "-" and are not entered on the score calculation. This is the simplicity of the method. After reading the report the professor can arrive at a precise and reproducible score in only a matter of minutes. The score is arrived at by dividing the total of numbers

"1" by the total number of items judged. Table 2 shows a typical score sheet.

The system is also quite flexible and can be adapted to any number of situations. Items can be added to the list (or deleted), as necessary, to suit the type of assignment being graded.

DISCUSSION

I have used this system for several years now, with excellent results. The students are usually surprised and intrigued

TABLE 1
Scoring Guide for Written Technical Communications

1. Work Efficiency

- 1.1 Submitted on first requested date
- 1.2 Submitted on second requested date
- 1.3 Submitted with one granted extension of deadline
- 1.4 Submitted with repeated extensions
- 1.5 Submitted on an arbitrary date
- 1.6 First or second version accepted
- 1.7 Third or later version accepted

2. Overall Quality of Presentation

- 2.1 Absence of scratches and visible corrections
- 2.2 Required margin is observed
- 2.3 Divisions of subject or text are clearly visible
- 2.4 Correct linkage to prior sections or parts of work
- 2.5 Figures and tables are on separate sheets
- 2.6 Writing is easily readable
- 2.7 Writing is readable with some effort
- 2.8 Requested format on paper and ink is used
- 2.9 Lines are double spaced
- 2.10 Item 2 is accepted in its first version

3. Quality of Editing

- 3.1 Existence of 100% of required text
- 3.2 Existence of 80% of required text
- 3.3 Existence of 60% of required text
- 3.4 Mean number of words per sentence is less than 16
- 3.5 Absence of grammar infractions
- 3.6 Percent of sentences containing grammar infractions is less than 5
- 3.7 Percent of sentences containing grammar infractions is less than 10
- 3.8 Absence of superfluous words or expressions
- 3.9 Percent of words with more than 4 syllables is less than 8
- 3.10 Percent of sentences containing style infractions (syntax) is less than 10
- 3.11 Absence of sentences without meaning
- 3.12 Absence of incomplete sentences
- 3.13 Existence of continuous and easily readable text
- 3.14 Text conforms to the required number of words
- 3.15 Item 3 is accepted in its first version

4. Technical Level

- 4.1 Existence of all items requested
- 4.2 Appropriate use of subtitles

- 4.3 Coverage of subject matter is above 90%
- 4.4 Coverage of subject matter is above 60%
- 4.5 Existence of correct reasoning for all items covered
- 4.6 Existence of correct reasoning for part of the items covered
- 4.7 Number of original ideas is above zero
- 4.8 Number of original ideas is above three
- 4.9 Absence of nonsense
- 4.10 Absence of meaningless, superfluous, or false arguments
- 4.11 Number of ideas expressed divided by number of sentences used is above 0.90
- 4.12 Sufficient information for reader to understand everything
- 4.13 Correct reference to attachments and literature
- 4.14 Item 4 is accepted in its first version

5. Quality of Calculations

- 5.1 Existence of titles and subtitles in the sample calculation
- 5.2 Elegant layout on the sheet
- 5.3 Origin of the data is identified
- 5.4 Symbols are defined
- 5.5 Sequence of presentation is clear
- 5.6 Equations are identified
- 5.7 Results are highlighted
- 5.8 SI units are used
- 5.9 Absence of arithmetic errors
- 5.10 Complete results are presented
- 5.11 Sufficient information for reader to follow and understand the calculations
- 5.12 Presence of 90% of sample calculation required by subject
- 5.13 Presence of 60% of sample calculation required by subject
- 5.14 Item 5 is accepted in its first version

6. Quality of Drawings, Graphs, and Tables

- 6.1 Identification by number and title
- 6.2 Correct layout on the sheet
- 6.3 Requested margin on the left side or top of page
- 6.4 Coordinates are identified
- 6.5 Scales are stated
- 6.6 Drawing aids used to draw lines and curves
- 6.7 Good quality lettering
- 6.8 Suitable for double reduction on a copying machine
- 6.9 Presence of 90% of information required by subject matter
- 6.10 Presence of 60% of information required by subject matter
- 6.11 Item 6 is accepted in its first version

TABLE 2
Scoresheet for Written Technical Communications

<i>Item Evaluated</i>														<i>Score</i>	
1. Work efficiency	0	1	1	-	-	1	-								75%
2. Overall quality of presentation	1	1	0	0	1	1	-	1	0	1					67%
3. Quality of editing	0	0	1	1	0	0	1	1	0	1	1	1	1	1	67%
4. Technical level	1	0	1	1	0	1	1	0	1	0	0	1	1	0	57%
5. Quality of calculations	1	1	0	0	1	1	0	1	1	1	1	0	1	1	71%
6. Quality of drawing, graphs, tables	1	0	0	1	-	1	1	0	0	1	0				50%
TOTAL SCORE (Average)													65%		

by the guide when they first receive it, and they confidently set out to write their first report. It is a common occurrence for their first report to be returned to them for rewriting, but within a short time (usually within two or three assignments) they have familiarized themselves with the system and they begin to produce excellent reports.

The scoring guide is not limited in any sense of the word—not to a specific language or to a specific environment. It is applicable in any language of instruction and may even be taken along as a guide for a junior engineer on the job. It has been called "mechanistic," which in fact it is. It has no pretensions of being profoundly philosophic. It guides students (and possibly engineers) in a very simple and modest way in the preparation of reports. It challenges them to define and attain their own degree of perfection. In this sense it represents a general philosophy of writing instruction that can be applied to any type of writing. Project reports, review reports, laboratory reports, and most technical assignments can all be easily handled with the scoring guide (tailored, as necessary, to the specific subject).

Different weights can be assigned to different items, or a total score can be used instead of averaging the six partial scores as shown in Table 2. In fact, I have tried these different approaches in the past, but for various reasons I have later dismissed them. The score sheet shown in Table 2 has emerged over the years as the most effective, expedient, and simplest method of scoring. But opinions differ, and the beauty of this system lies in the fact that it can accommodate any number of adaptations.

Various items on the guide require a personal judgment on the part of the grader. This is unavoidable. As a corrective instrument, the guide warns writers that these judgments will be made, and it allows the writers to stack the odds in their favor by paying special attention to those various requirements. The originality of the whole idea, in fact, lies in this corrective aspect of the guide.

No grade is assigned to the work until it is judged acceptable, but unfortunately, acceptability in itself is a subjective notion. (For example, how often does peer review of technical papers produce unanimous results?) The professor will establish his or her own definition of acceptability by answering and weighting the questions posed at the beginning of this article, which bear repeating here:

- *Is report writing considered an essential part of engineering apprenticeship?*
- *Is enough time taken in teaching students how to write a report and check the feedback, or is the teaching assistant left to struggle along on his own?*
- *How objective is the professor when evaluating a report?*
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Although each of the items on the scoring guide calls for a personal judgment on the part of the grader, that judgment will (hopefully) remain the same in all cases and not vary from one paper to the next. For example, an "0" for items 2.7, 3.3, 4.4, or 5.9 on the guide will always render a report unacceptable to me, and students are so informed at the very beginning of the course.

CONCLUSIONS

No writing guide can be perfect or final, and this one is no exception. But if the philosophy behind it is accepted and it is adapted to improve your present grading system, my objective in writing this paper has been realized.

REFERENCES

1. Plung, D.L., "Evaluate Your Technical Writing," *Hydrocarbon Proc.*, p. 195, July (1981) □