

Applying the Pareto Principle to the analysis of students' errors in grammar, mechanics and style

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ABSTRACT

University educators everywhere are trying to assist students in improving their ability to write clear and correct business English. Business communication texts, in general, use several decades of research that have established a three-stage process: prewriting, writing, and rewriting (Collins & Parkhurst, 1996). Identifying and correcting errors in grammar, mechanics and style is part of rewriting, especially proofreading. As a basis for critiquing student work, previous research identifies which errors bother business people the most (Beason, 2001; Gray & Heuser, 2003; Hairston, 1981), and focuses and simplifies work on grammar and mechanics. Few students make frequent errors in all the categories. A statistical tool often used in quality analysis, the Pareto Principle, also known as the 80-20 rule, could prove useful in motivating students to improve their work. For students' errors in grammar and mechanics, this project proposed to analyze errors made by individuals to identify "the critical few" errors. Correcting these errors could improve writing up to 80 percent. The project involved a two-stage process to investigate the utility of the Pareto Principle as a device for setting priorities in the area of grammar, mechanics and style. Results identified the top three errors for attention across all student groups analyzed and for the aggregated groups. Across the classes, Pareto Charts demonstrated a consistent focus on three to six errors, so that, in the classroom, the instructor can concentrate on the "vital few" to improve writing quality. Using the results of this analysis, then, focuses instruction, practice, and grading on the areas that will produce the most improvement:

- Writing concisely, including eliminating "there is" and "it is"
- Comma usage, and
- Passive voice.

Reducing the field of errors for students allows both the instructor and the student to focus, making the grammar/mechanics improvement challenge more manageable.

Keywords: Business Communication, Instructional Strategies, Pareto Principle, Grammar and mechanics, grading strategies, writing fundamentals, writing assessment

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INTRODUCTION

University educators everywhere are trying to assist students in improving their ability to write clear and correct business English. Employers' desire for employees who are good communicators, both orally and in writing, is well documented in workplace surveys (National Association of Colleges and Employers (NACE), 2015). At the same time, a survey of employers by the AACSB (2006) found that only 27 percent of them believe recent college graduates are able to write well as they enter their careers, and the same survey found that recent graduates overestimate their career readiness as writers with 65 percent rating themselves as well prepared. By the time students reach their university education, solving problems with writing style and mechanics is difficult, and business communication instructors are searching for strategies and methods to assist.

Business communication texts, in general, use several decades of research that have established a three stage process: prewriting, writing, and rewriting (Collins & Parkhurst, 1996). Identifying and correcting errors in grammar, mechanics and style is part of rewriting, especially proofreading. Students may underestimate the importance of this stage and not allocate enough time to doing it properly (Adams, Simmons, Willis & Pawling, 2010; Hayes, Flower, Schriver, Stateman & Carey, 1987; MacArthur, 2007; Somers, 1980). Even allotting enough time for a thorough review, however, cannot solve the problem if the writer lacks knowledge of grammar and, hence, the ability to recognize errors in the text (Hayes, 1985; MacArthur, Graham & Harris, 2004).

While building this knowledge may seem to be a simple matter of teaching and learning, most college business writing courses focus on analysis, strategy choice, and formatting with no time available for basic, repeated drill on English fundamentals. Time instructors may invest in identifying errors does not often transfer to other writing assignments (Hynes & Stretcher, 2008). In the light of these challenges, instructors are experimenting with approaches to help students improve their performance in the area of grammar, mechanics, and style, and this project represents one experiment in this effort.

CURRENT APPROACH

As a basis for critiquing student work, previous research identifies which errors bother business people the most (Beason, 2001; Gray & Heuser, 2003; Hairston, 1981), and focuses and simplifies work on grammar and mechanics. Hairston (1981) and Gray and Heuser (2003) use the same framework to group errors into categories of Status Marking Error, Very Serious Errors, and Serious Errors. I create a handout for students listing and defining these errors from the literature. To the list of errors in the existing research, I add attention to two issues of writing style--overuse of passive voice and of "there is/it is"--to guide students regarding what errors to identify and correct when they rewrite. Between the handout and the style errors, I grade for 22 different errors (see Table 1 for the list).

Table 1: Errors from the Writing Correctly Handout and Style Errors

Writing Correctly Handout Errors		Style Errors
• Nonstandard verb forms	• Non-parallelism	• Passive voice
• Lack of verb/subject agreement	• Faulty adverb forms	• It is/There is
• Double negative	• Verb form errors	• Word choice/wordiness
• Objective pronoun as subject	• Dangling modifiers	• Number style
• Sentence fragment	• “I” as object pronoun	
• Run-on sentence	• Lack of commas to set off interrupters	
• Non-capitalization of proper nouns	• Lack of commas in a series	
• Misspelling	• Tense switching	
• Comma between the verb and its complement	• Use of a plural modifier with a singular noun	

After reviewing these errors, engaging in some practice, and using a test to self-diagnose problem areas, I employ a strategy of “minimal marking” and highlights errors in yellow without identifying them. In revision assignments following the return of graded original submissions, students must identify and correct the errors they made. Scores for multiple revisions constitute the points students earn for grammar/mechanics and style. The goal is to enable the students, through repeated revision and error identification, to become acquainted with their own most frequent errors and to correct and improve their work before they turn it in.

Grading these assignments has led me to several observations. First, few students make frequent errors in all the categories. For some students, the problem area is commas, while, for others, the problem might be sentence errors or spelling. Second, this first observation reminds me of a statistical tool often used in quality analysis, the Pareto Principle, also known as the 80-20 rule, which could prove useful in motivating students to improve their work.

THE PARETO PRINCIPLE

An economist, Vilfredo Pareto, observed early in the 20th century that 20 percent of the population possessed 80 percent of the wealth (Grosfeld-Nir, Ronen & Kozlovsky, 2007). Quality guru Joseph M. Juran attached Pareto’s name to the principle when he generalized its application to quality (Baudin, 2012). Juran and others applied the principle to quality improvement, and created “A,” “B,” and “C” classifications. The “A” group, termed “the vital few,” consists of approximately 20 percent of the attributes (items) and accounts for 80 percent of the phenomenon. The “B” group, consisting of the next 30 percent of the items, accounts for 10 percent of the phenomenon. The “C” group, termed “the trivial many,” contains 50 percent of the items and accounts for only 10 percent of the phenomenon (Grosfeld-Nir, Ronen & Koxlovsky, 2007). This classification has proved to be a useful tool for busy managers who need methods to focus their time, attention, and resources on what is truly important, a similar goal to the students’ goals.

Using the method requires the researcher to define quantities and categories properly and to retrieve data for classification. Analysis identifies “the vital few” as a focus for action and recommendations (Baudin, 2012). Baudin (2012) describes the application of the technique in manufacturing as a tool for insuring quality. In manufacturing, the classical Pareto analysis partitions items based on only one type of defect. Analysts then plot a bar chart of the relative frequencies of each defect in the population tested. The top 20 percent of the categories hold 80 percent of the quantity in question (Baudin, 2012).

For students’ errors in grammar and mechanics, this project proposes to analyze errors made by individuals so that we can identify “the critical few.” When we eliminate or minimize “the critical few” for each individual, we solve 80 percent of the problems we have. Thus, by applying the Pareto Principle to the classroom, I intended to motivate students to improve their writing by reducing the size and scope of their perceived writing weaknesses.

RESEARCH PROJECTS

A two-stage process was used to investigate the utility of the Pareto Principle as a device for setting priorities in the area of grammar, mechanics and style. The first stage was a pilot project using 26 cases selected at random to test the concept. The second stage incorporated a much larger data set and used a tally sheet developed from the first project. Documents analyzed for both studies came from work in a Business Writing course required of all students in the College of Business Administration.

First Stage Project

This project was a preliminary analysis of graded student work to test the following hypotheses:

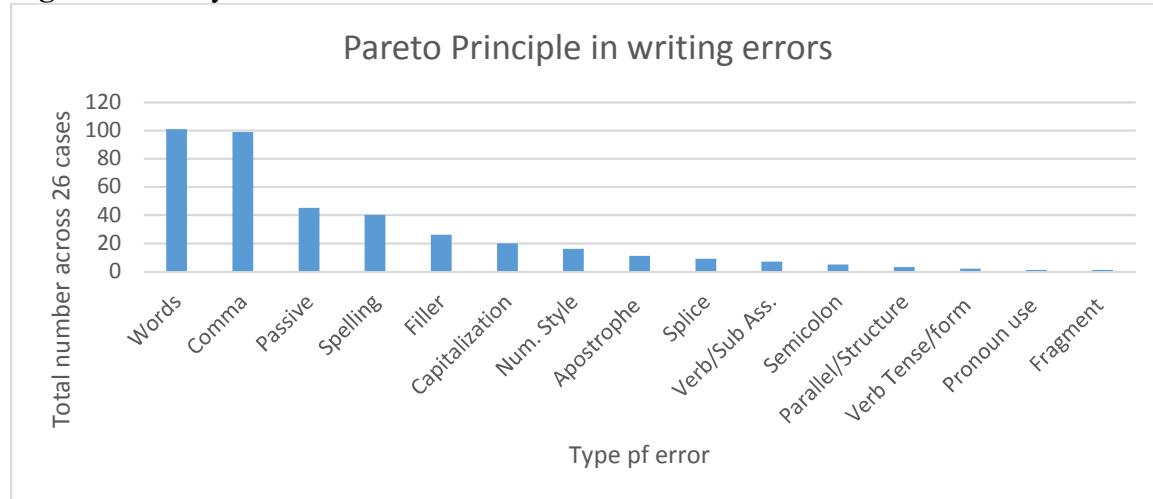
- H1: Errors across the assignments will fall into limited categories for each student case.
- H2: For each student, the top 20 percent of errors committed will constitute 80 percent of the problems that student has.

Method

Using a random number generator, the investigator selected six cases from each of five recent sections of a Business Writing course for a total of 30. Each case consists of three graded assignments: Résumé/Cover Letter, Bad News Letter, and Persuasive Letter. Four of the cases had an incomplete set of documents, so that the analysis used 26 complete cases. For each case, the researcher counted highlighted areas and grouped them into categories drawn from the literature, including sentence errors, comma errors, punctuation other than commas, grammar errors such as verb/subject non-agreement, spelling, and style errors such as passive voice and “there is/it is.” Numbers of errors ranged from two to 23 for the three assignments in each case.

Results

The initial study cases yielded 15 different errors among the cases. The Pareto chart for the study showed three errors as “the vital few:” (1) word choice/wordiness/missing words, (2) comma errors, not including comma splice, and (3) passive voice. See Figure 1 below.

Figure 1: Study 1 Pareto Chart

Based on the Pareto Chart, H1 is confirmed; errors for each student fell into limited categories. The 15 resulting categories defined all errors in the cases analyzed. Conversely, H2 was not confirmed; only six of the 26 cases analyzed met the 80/20 rule. For most students, their top two errors equaled 50 % or more of their total errors. Even if the 80/20 barrier was not met, however, the project demonstrates that individual students don't make every error. If students can identify the limited errors they make, they can focus their study efforts to achieve notable improvement.

From these results, two strategies emerged for teaching grammar/mechanics/style in the classroom.

- Concentrate practice and instruction on concise wording, use of commas, and passive voice to achieve the maximum improvement in writing quality for most students.
- Concentrate on the next 30% of errors to further improve writing quality across the board: spelling, use of filler words (there is/it is) capitalization, number style, and use of apostrophes.

For students and their instructor, then, the Pareto Chart has reduced the field of errors from 22 to eight, increasing the opportunity to achieve substantial improvement in a brief time period.

Second Stage Project

Based on this preliminary analysis with a small data set, I decided that a larger study with a deeper data set could demonstrate with more validity how the tool would work. I suspected that students would be able to focus their time and effort on just a few categories for improvement resulting in 80 percent better work in the area of grammar, mechanics and style.

Method

For this project, I used three letters each from four class sections, a total of 114 cases. These groups are fall and spring semester sections of the same course with the same instructor, textbook, and syllabus taught over two academic years. Letters analyzed included an informative message, a bad news message, and a persuasive message, all one page letters. One case had an incomplete set of documents and was eliminated from analysis resulting in a final total of 113 sets of documents. Comparing results from multiple sections should demonstrate differences in the number and type of common errors, both section-to-section and section-to-overall.

For this analysis, I prepared tally sheets from the results of the first project, and used them as cover sheets for each case to record error counts. Analysis of student errors for the second project added five errors to the total list: missing/inappropriate periods, misplaced modifier, colon use, and run-on sentences. For the second project Pareto Chart, then the overall analysis included 20 errors.

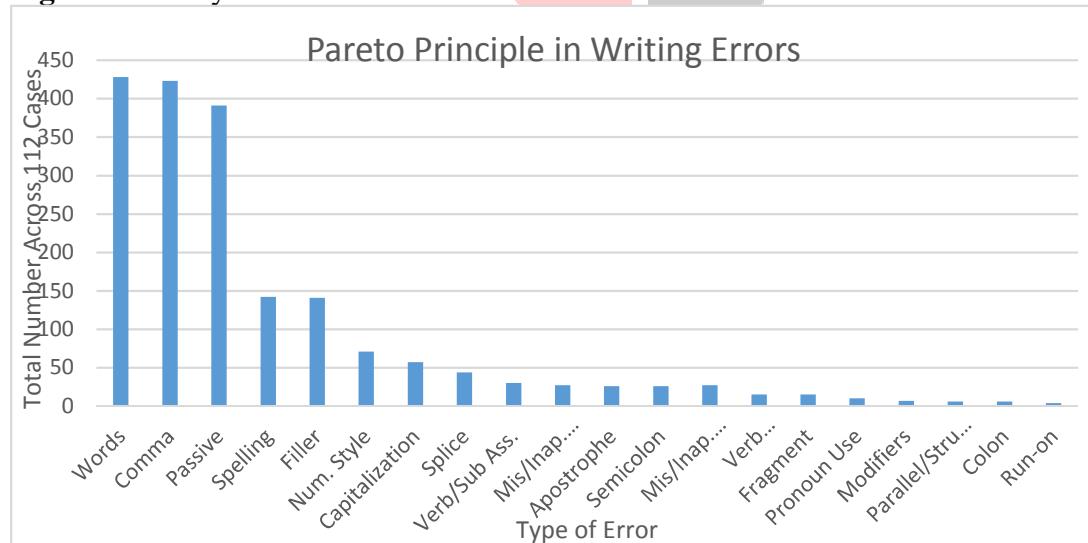
This project focused on two hypotheses:

- H1: The “vital few” for the larger data set will duplicate the findings of the earlier study.
- H2: Pareto Charts for each of the four class sections analyzed will duplicate the findings of the earlier study.

Results

The Pareto Chart for all 113 cases yielded a “vital few” identical to the smaller study: word choice/wordiness, comma errors, and passive voice. The next 30% of errors for the larger group duplicated the smaller study findings except for one error: spelling, use of filler words (there is/it is), number style, capitalization, and comma splice error. Except for the apostrophe error in the next 30%, then, H1 is confirmed for the Pareto Chart which included all 113 cases.

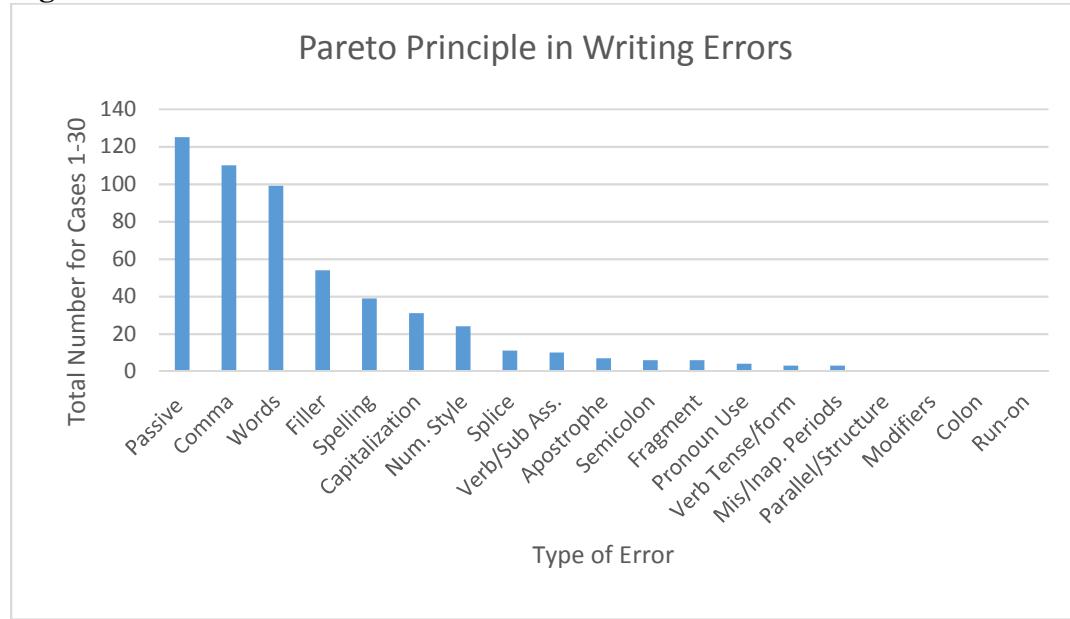
Figure 2: Study 2 Pareto Chart



INDIVIDUAL CLASS SECTION CHARTS

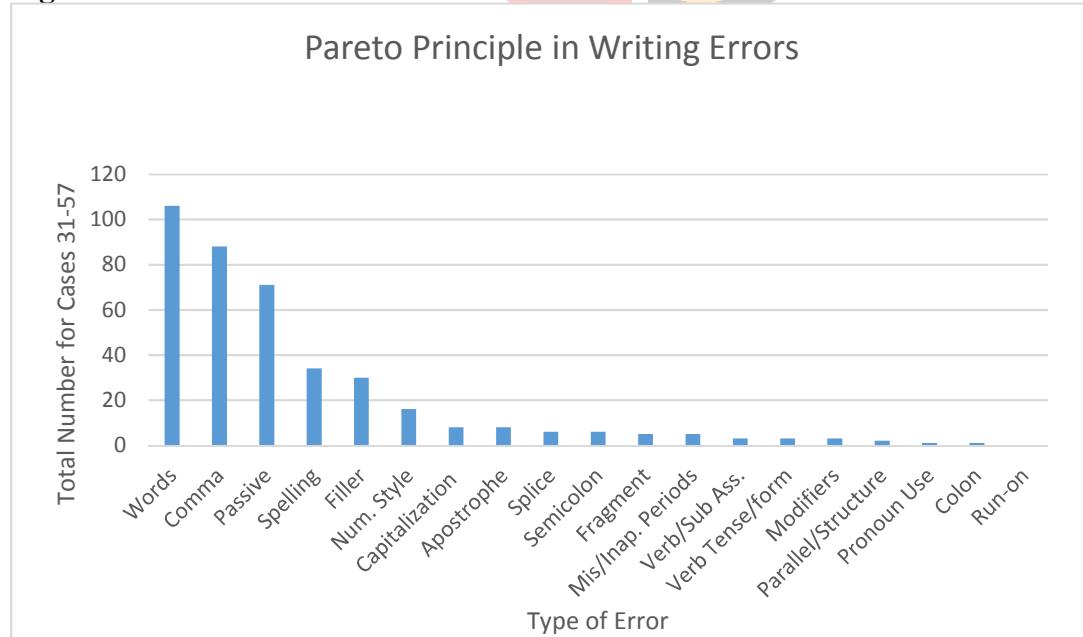
To investigate whether overall results for the 113 cases would apply to the four individual class sections, Pareto Charts were constructed for each of the four class sections. At the individual class section level, “the vital few” remained consistent, though not always in the same order, but the next 30% showed differences.

Figure 3: Class Section #1—30 cases



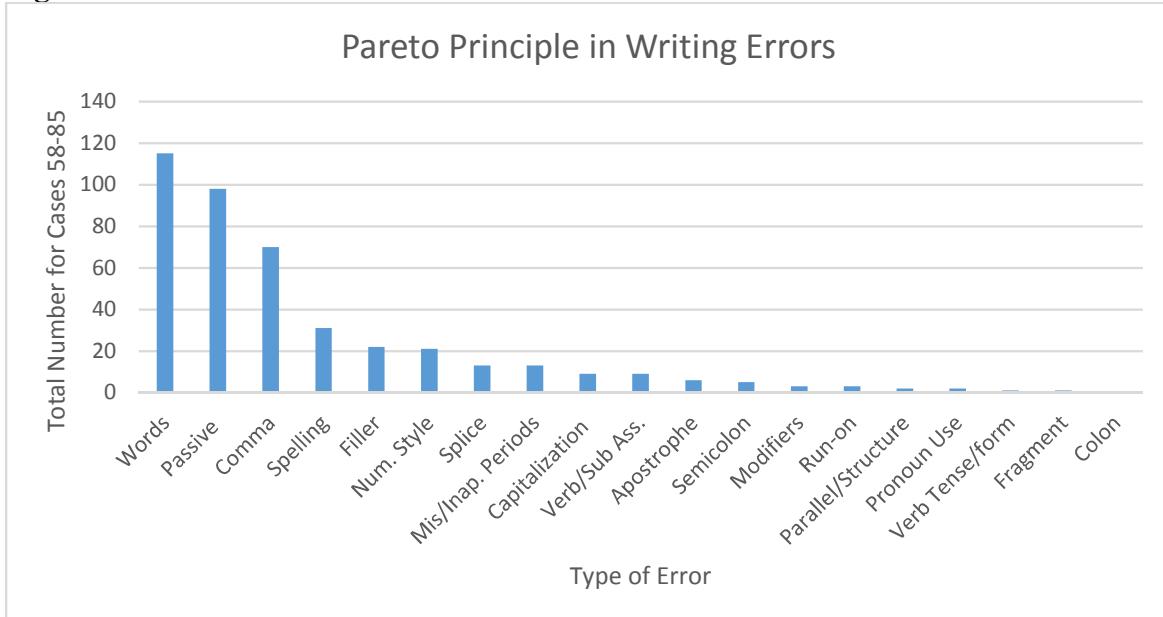
Class section #1 results showed passive voice as the most frequent error, followed by comma use, and, finally, word choice/wordiness. The next 30% was consistent with the larger group.

Figure 4: Class Section #2—26 cases



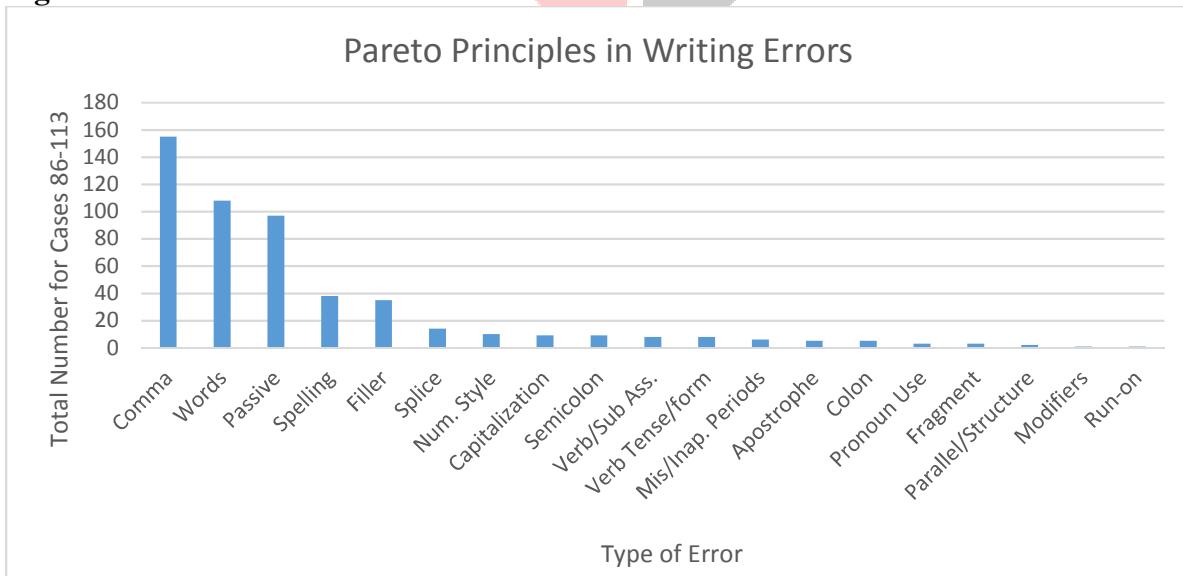
Results for class section #2 duplicated the findings for the large group, including the order of magnitude for the errors and the next 30%.

Figure 5: Class Section #3—27 cases



The “vital few” and the next 30% for class section #3 also duplicated the findings for the larger group.

Figure 6: Class Section #4—27 cases



For class section #4, the “vital few” remained, but in a different order. For this section, comma errors were most frequent, followed by word choice/wordiness, and then passive voice. The next 30% differed as well, including spelling and use of filler words but including the comma splice error.

For the four class sections, then, H2 is confirmed for content, if not for order, of the “vital few:” word choice/wordiness, comma use and passive voice. More variation occurred for the next 30% from the overall chart, but, in general, results were consistent with the Pareto Chart for all 113 cases.

DISCUSSION

Business students have many reasons to perfect their writing ability. Surveys consistently demonstrate that the ability to write clearly and correctly is essential for students both in college and as they enter the workforce. University research and employer surveys support the importance and value of effective writing (Addams & Allred, 2015). Employers place a high value on employees’ ability to think critically and solve problems, and expect them to be able to express their ideas in writing (National Association of Colleges and Employers [NACE], 2017; Hart Research Associates, 2013, 2015). Workplace writing ability is a “threshold skill” for hiring and promotion of professional employees, according to the College Board (2004). Ability to communicate in writing routinely ranks high on lists of critical skills that college graduates need and employers seek (AACSB International, 2006; College Board, 2004; Ghannadian, 2013; NACE, 2015; Partnership for 21st Century Skills, 2009, 2011).

At the same time, employers identify communication as a weak skill area for recent college graduates. A survey by the Accrediting Council for Independent Colleges and Schools found that employers believe colleges and universities are not adequately preparing students for the workplace (ACICS, 2011). Students are expected during their academic program to develop and improve their writing and speaking skills, and employers expect to find an acceptable skill level at the point of hire.

Certainly, effective writing includes critical and analytical thinking, but, without mechanics to insure conciseness and clarity, writers can miss the opportunity to bring their ideas to wider audiences. Helping students improve in the area of mechanics, however, is problematic. As Goldblatt (2013) notes, “Students in remedial English classes are almost always smart enough to write college-level prose, but they don’t know how to put sentences together in ways that clarify, rather than cloud, what they’re trying to say (p. A13).” Goldblatt (2013) and Wright and Larsen (2016) note that, while the current generation of students writes more frequently than previous generations due to their use of email, texting, and social media, their writing is quick and careless, full of shortcuts and errors, and directed to readers who are less likely to care. Instructors for business writing, then, must overcome motivational barriers in the student, as well as limited time for instruction in mechanics.

College-level business writing courses typically concentrate on strategies, analysis, and formatting with little time available to drill on mechanics or language structure, so universities are caught between the expectations of employers and their ability to achieve improvement in students’ writing. The results from the Pareto Principle analyses demonstrate a way to set priorities for improvement in a way that will achieve the greatest improvement for the most students in a short time. Across the classes, the Pareto Charts demonstrated a consistent focus on three to six errors, so that, in the classroom, the instructor can concentrate on the “vital few”

to improve writing quality. Using the results of this analysis, then, I can focus instruction, practice, and grading on the areas that will produce the most improvement:

- Writing concisely, including eliminating “there is” and “it is”
- Comma usage, and
- Passive voice.

Reducing the field of errors for students allows both the instructor and the student to focus, making the grammar/mechanics improvement challenge more manageable.

Next steps for research will involve application of findings to actual classroom activity followed by assessment, tracking and measurement to determine the effects of the strategy on numbers and type of errors. As in corporate settings, the Pareto Principle can assist both students and instructors to set priorities so that both groups can maximize the value of limited classroom time to achieve substantial improvement in a short time.

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