

A review of ETS's Criterion online writing program for student compositions

This study will report on the findings of first-year Japanese university students using ETS's Criterion© Online Writing Evaluation Service. The study focused on two research questions: (1) were there important differences in ETS's computerized feedback and teacher feedback, and (2) was there any improvement in student writing over the school year? For the 2012-2013 academic year, students wrote six compositions. Results indicate that teachers tended to focus on meaning, whereas computerized feedback centered on grammatical and stylistic issues. As for student progress, only four specific areas showed any marginal improvement: confused words, spelling, missing commas, and too many short sentences, indicating that students became slightly better at expressing meaning and in using punctuation more effectively. The data indicate there were some drawbacks with ETS's computerized feedback evaluating meaning and organization of ideas, but that it was helpful in evaluating some aspects of grammar, mechanics, usage, and style.

本論は日本の大学1年生を対象にETSのCriterionオンライン作文ソフトを使用した結果をまとめ、次の問いについて論じたものである。すなわち、(1) ETSのコンピュータによるフィードバックと教員によるフィードバックに重大な差が存在するか、(2) 1年を通して学生の作文に改善がみられたか、である。(1)については、2012年度に6回の作文を分析した結果、教員のフィードバックが意味に注目しがちなのに対して、コンピュータのフィードバックは文法的、文体的問題を主に扱っていることが判明した。(2)については、4つの領域(語の混同、スペリング、コンマの欠如、頻出する短文)においてのみ、わずかな改善がみられた。ここから考えられるのは、学生が意味表現でわずかながら改善し、句読点をより効果的に使用できるようになったことである。結論として、使用したデータによると、ETSのコンピュータによるフィードバックは、意味や概念の整理について評価する際に欠点を露呈している。ただ、文法、構造、用法、文体のいくつかの面を評価するには役立つものであると言える。

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Universities are coming under more pressure to prove the effectiveness of their educational programs. Accountability is now the keyword for the time, so much so that in some universities, educational departments and English programs have decided to rely on TOEIC test scores as a benchmark of how their students are improving. The common criticism of using such scores is that they are only indicators of students' analytical abilities, and of their receptive skills, such as listening, reading, and grammatical analysis but not of their productive skills. Hirai (2008) did examine the correlation between TOEIC and the STEP BULATS Writing test, and his results indicated the overall correlation coefficient to be .69, suggesting that this was not high enough to rationalize the use of TOEIC Test scores as an indicator of writing skills. Thus, more awareness is needed among educators about the issue of correlating a test score that is, in essence, based on passive skills with those of productive ones.

Despite the apparent need for more essay writing and critical thinking, writing has often been an area that has been too difficult to address in large classes (of 40 or more students) due to the time needed in correcting large numbers of papers. Further, with such traditional pen and paper-based compositions, it is time-consuming if not impossible to identify word lengths, and analyse lexical or syntactical complexity. Likewise, compiling data relating to grammar, syntax, and vocabulary from among all of one's students or from various classes and teachers can be problematic. Feedback also becomes an issue with paper-based compositions as teachers' comments are often scribbled in the paper's margins, making data analysis from various classes difficult. Because of the above issues, the English section at our institution decided to try ETS's Criterion©

writing program as one means of monitoring student progress in regard to writing.

The purpose of this paper then, is to report on the effectiveness of ETS's Criterion for Japanese EFL students after a year of its implementation, particularly in regard to computerized and teacher feedback for grammar, usage, mechanics, and style (see Appendix A for a description of how Criterion works and a list of specific features).

Background

The first computerized assessments of student compositions came in 1966 with Project Essay Grade (PEG), introduced by Ellis Page (Rudner and Gagne, 2001). It was not, however, until the 1990s that the use of computer scoring came to be accepted in English education with Intelligent Essay Assessor (IEA), which was introduced for essay grading in 1997 by Thomas Landauer and Peter Foltz (Landauer, Laham, and Foltz, 1999), followed by Select-a-Kibitzer, (Wiemer-Hastings, 1999), as well as E-rater (Educational Testing Service, 2013), developed by Jill Burstein (1998). E-rater, which is a scoring engine, is used in 20 applications such as Criterion, GRE, TOEFL, and TOEFL Practice Online. It is essentially a sophisticated "Hybrid Feature Technology," using 60 different features to analyse structure. The software takes into account the issue of syntactic variety, counting the number of complements, subordinates, infinitives, and relative clauses and the occurrences of modal verbs in order to calculate the ratios of these syntactic features per sentence and per essay. In order to obtain a final e-rater score, the software weighs the features scores using a regression scoring model.

Yigal and Burstein (2006) found that e-rater scores have significantly higher alternate form reliability than human scores while measuring virtually the same construct as scores from teachers. Thus, as computerized scoring became faster, and demonstrated increased accuracy and complexity (thus eliminating concerns about rater consistency and fatigue), more teachers and administrators began to accept it as an educational tool.

Lim and Kahng (2012), Han, Chodorow, and Leacock (2006), and Tetreault and Chodorow (2008) have pointed out that while there is correlation with human rates in evaluation, there is also a high rate of erroneous error detection. Lim and Kahng (2012) also argue that since Criterion emphasizes errors regarding surface-level

linguistic features or textual forms (disregarding content or tone issues), it is important for teachers to inform students about these two issues. Other research themes concerning computerized assessment focus on validity and automated scoring (Bennett, 2004; Bridgeman, Trapani, & Attali, 2009), automated feedback, and its actual impact on students' writing (Kellogg, Whiteford, & Quinlan, 2010; Kukich, 2000), and comparative studies of human scoring and automated scoring (Wang & Brown, 2007). However, no studies compared the kinds of feedback that computerized feedback and teachers gave, particularly to Japanese EFL students. In short, the literature has still not clarified whether or not there are important differences between computerized and teacher feedback. A second issue, in regard to Japanese EFL writing and student progress (over a school year), is in what specific areas (grammar, usage, mechanics, or style) does ETS's software indicate students have made the most significant progress, if any.

The study

Rationale

The purpose of using ETS's Online writing evaluation program was to have a valid and reliable system for the assessment of students' errors, teacher feedback and comments, and to examine possible differences in computerized vs. teacher evaluation (see Appendix B concerning Criterion's Feedback in regard to a student's essay, and Appendix C for graphical results for grammar, mechanics, usage, and style). Unlike in previous research concerned with how computerized scoring correlated with human evaluation, this research focuses on how teachers differed (if at all) in their feedback as compared to ETS's feedback.

Research questions

1. Were there any important differences between ETS's computerized and teacher feedback?
2. Was there any improvement over the school year, and if so, in what areas?

Procedure

The compositions for this study were taken over the 2010-2011 school year and involved a total of 1,275 papers. There were three modes of writing for each semester, with the first paper

being descriptive (250 words), in which students introduced themselves. The second paper was argumentative (300 words), whereas the third paper was narrative (350 words). For the second semester, the modes were continued (descriptive, argumentative, and narrative), with the word limit reaching 500 words for the last paper. Some teachers (and students) did not, however, always observe this guideline. For each paper, students were given approximately one month, with teachers having around 10 days to give feedback via ETS's pop-up notes (suggesting corrections) as well as through overall comments. Class credit was given for each paper. In considering the issue of student progress, only students who had completed all six papers were included in the study.

The appointed administrators (there can be more than one) were then able to view the data relevant to each teacher, class, and student, viewing both computerized and teacher feedback as well as the number of times that students had rewritten and resubmitted their papers. In this study, there were two administrators.

Data analysis

In answering the first research question concerning differences between ETS's computerized and teacher feedback, only the data based on one paper taken from one class from a teacher who gave a high level of feedback were used. For this paper, 26 students out of 28 students participated, writing on the theme of their future dreams. One of these papers was deemed plagiarized, leaving 25 papers with comments. The teacher gave 191 comments, averaging 7.6 comments per paper.

As for the second question concerning overall progress in writing, data based only on those students who had completed all of the six papers over the academic year were used. Thus, the data for this section included 216 students out of the 598 registered students. Out of this pool, 40 randomly selected papers from the first, third and sixth compositions were used for comparisons. From these papers approximately 170 words were taken from each paper in order to control for the variable of word length. The data set for the first paper totalled 7,052 words, averaging 176.3 words for each paper. The data for the third paper totalled 7,014 words, averaging 175.4 words per paper whereas for the sixth, the total word count was 7,104, averaging 177.6 per paper. These data sets were then submitted

to the Criterion database. While reducing the data in this fashion might impact the *meaning* of students' writing, it was felt that there would be minimal effect on the computerized feedback.

Results

Question 1. ETS's computerized feedback vs. teacher feedback

Based on ETS's computerized feedback, prevalent errors in students' writing involved the repetition of words (2,583), missing/extra article (2,426), spelling (2,171), fragment/missing comma (1,647), too many short sentences (1,590); subject-verb agreement (1,307), and wrong article (1,097). Other less common problems involved confused words, preposition errors, missing initial capital letter in a sentence, missing commas, and sentences beginning with a conjunction. However, in regard to differences between computerized feedback and teacher feedback, the data from one semester (Long & Tabuki, 2012), showed that teachers tended to focus their feedback on meaning (confused words, garbled words, wrong form of word, etc.) and in examining the current data, similar results were encountered (see Table 1). In the area of mechanics, teachers gave no feedback whatsoever on the need to capitalize the initial letter in a sentence or in proper nouns, or advising students on missing punctuation, periods, commas, and compound words. As for style, teachers did not comment on sentences beginning with a conjunction, or the use of too many short sentences or passive voice.

Table 1. Differences in teacher and computerized feedback

Grammar	ETS' Feedback	Teacher Feedback
Fragment/missing comma	104	0
Run-ons	58	0
Garbled sentences	10	42
Subject-verb agreement	78	0
Ill-formed verbs	38	8
Usage		
Wrong article/Missing/extra article	211	28
Confused words	42	5
Preposition errors	49	22

Mechanics		
Spelling	135	4
Style		
Repetition of words	153	0
Inappropriate words	0	23

These results indicate that teachers tend to overly focus on meaning, thereby sidestepping issues that relate to mechanics and style, particularly referring to syntax and sentence length. The reason for this is that teachers may often tolerate or ignore issues relating to basic mechanics, or they may refer to them once or twice, but ignore similar errors later on in the essay. Sentence length is also an issue that can easily be missed, as teachers are less likely to count words or examine the length of concurrent sentences. Based on the students' level, teachers will tend to focus on particular areas in regard to their comments; however, this practice does necessarily limit the scope of their feedback. In short, while both kinds of feedback are important, students need to learn how to identify which are the most serious kinds of errors that they need to address, and to form new goals on improving in their next essay (see Appendix D for an error feedback and composition preparation handout which helped to address this issue in the past academic year).

Question 2. Student improvement

The issue of student progress was taken up by examining randomly selected papers, controlling for word count. The results indicate minimal improvement in the area of usage and marginal improvement in mechanics, whereas grammar and style showed an increase in errors. This data suggest that more writing practice is needed along with more focused tasks addressing rhetorical and grammatical issues (see Tables 2 and 3 for more details).

Table 2. Areas of improvement (controlling for word count)

Errors	Paper 1	Paper 3	Paper 6
Errors in grammar	77	94	101
Errors in usage	119	138	105
Errors in mechanics	359	116	284
Errors in style	1328	1337	1433

Table 3. Feedback analysis for parts of speech (controlling for word count)

Grammatical Errors	Paper 1	Paper 3	Paper 6
Fragment / Missing comma	38	51	45
Run on sentences	10	13	15
Garbled sentences	0	1	2
Subject-Verb agreement	10	15	14
Ill-formed verbs	2	6	5
Possessive errors	0	5	8
Wrong or missing word	0	0	2
Proofread This!	7	3	10
Usage			
Wrong article	13	15	15
Missing or extra article	92	106	78
Confused words	9	8	7
Wrong form of word	2	0	0
Preposition error	2	9	5
Negation error	1	0	0
Mechanics			
Spelling	328	75	245
Capitalize proper nouns	4	2	0
Missing initial capital letter in a sentence	15	25	27
Missing question mark	3	0	3
Missing final punctuation	0	1	0
Missing comma	3	1	2
Hyphen error	2	3	0
Compound words	3	1	3

Duplicates	0	4	4
Style			
Repetition of words	883	1127	1152
Sentences beginning with coordinating conjunctions	39	65	49
Too many short sentences	402	134	226
Passive voice	3	10	6

In short, only *four* specific areas showed any marginal improvement: confused words, spelling, missing commas, and too many short sentences, indicating that students were slightly better at expressing meaning and at using punctuation more effectively. Spelling did show some improvement from the first to the third papers, but teachers tended to ignore this issue as many of the words were related to Japanese names or customs and thus were incorrectly flagged.

Discussion

These results indicate that computerized feedback does significantly differ from that of teachers. Japanese students tend to have problems with using new words and articles, but often struggle with issues of style, such as how to effectively introduce a problem or issue, providing transitions, and concluding effectively. In evaluating errors related to style, teachers often overlooked sentence length as it was generally too difficult to judge, whereas errors that associated with meaning (garbled sentences/wrong word forms) were easier to identify and to respond to. A second issue in style (the repetition of words) also proved problematic insofar that it was simply too difficult for teachers to estimate how many times words have been repeated. It is apparent that issues relating to meaning take priority in a teacher's feedback over issues relating to usage, mechanics, and style. Thus, the results from the first research question indicate that feedback (computerized or teacher-based), if it is to be effective, should be systematic, with students revising their incorrect sentences, keeping error logs, and comparing their problems with their classmates. Teachers should focus on particular grammatical issues or strands and work on these issues repeatedly in different contexts and levels of difficulty. Ideally, many of the

examples that the teacher works from as lecture points and for exercises should be adapted from errors that his or her students made.

The results for the second research question concerning student improvement (with students showing marginal improvement in just four areas) show that writing, if it is to be truly effective, should be more in-depth, with weekly assignments and with more resources.

Conclusion

Using ETS's Online writing program has specific advantages of valid computerized data on page lengths, error rates, and computerized feedback. This feedback and data are proving to be a valuable means of improving the English education program, and to move beyond the test-score mentality and help students with specific skills that they will actually need when they start working. It was clear there were distinct differences in teacher and computer feedback, with ETS's program providing robust feedback on the four areas of writing and with teachers being concerned with meaning and word choice.

However, it is clear that providing feedback (both computerized and teacher-based) is merely the first step. These results show that the most important issue concerns how students were using (if at all) both kinds of feedback to improve their next paper (see Appendix D). Second, it is important to have very specific goals for each paper. For next year, in addition to the word count, students will need to attempt to provide a variety of reasons and examples to back up various statements, to use various verb tenses, marks of punctuation, in addition to trying out compound and compound-complex sentences.

There were some problems with teachers and students not paying attention to varying goals relating to page length, along with some teachers not giving feedback via Criterion's pop up notes. As for longer essays, Criterion would not be so helpful concerning issues of organization, transition, and whether or not the writer was effective or persuasive in his or her arguments. However, the program is proving to be a valuable means of not only addressing writing as well as speaking insofar that students use their papers to make a class presentation.

While Cheville (2004) has pointed out concern about the alliance between a private company such as ETS Technologies and her institution, and fear of how "machine-based essay scoring might well undermine the theoretical and practical knowledge of our preservice teachers"

(p. 47), I would argue that it is more important to prove (with computerized data) how students are actually in order to support or improve a particular program. Thus, the advantages (in compiling data about students' progress, establishing reliability in scoring such papers, providing faster score reporting) seem to outweigh the drawbacks (the cumbersome interface, inputting feedback, emailing data to students, and having more corporate involvement in education). Furthermore, if teachers and institutions accept the computerized feedback as being sufficient, teachers' workload will decrease, and students, in turn, will have more time for more and more varied writing assignments. In short, as educators, it is important to focus more on the productive skills of writing and speaking, as students will be tested and judged throughout their lives by how well they can communicate and influence their peers, perform in job interviews, and effectively write and present informative reports.

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Appendix A

Using Criterion

In using Criterion, students, teachers and administrators can register and log in at the following website <<https://criterion4.ets.org/cwe/>>. Administrators can create classes, assign teachers and writing assignments along with setting beginning and end dates for each assignment. Teachers can design their own particular assignment by clicking "assignment options" and writing the essay prompt or choose from 16 categories ranging from college-level first year to grade nine. Depending on the category, there can be up to four modes of writing: descriptive, expository, narrative, and persuasive. After choosing the essay topic category, and topic mode, teachers (or administrators) can click on the essay topic drop-down box and choose from a wide range of essay topics, each of which has a self-generated prompt for students. For example, in college-level first year using the persuasive mode, teachers can choose from topics such as "Rebellion," "Reality Class," "Peer Pressure," and "Music," the latter of which provides the following prompt:

Some have said that music not only entertains people but also influences their thinking and behavior. To what extent do you think music has the power to influence as well as to entertain people? Support your views with reasons or examples from your reading, observations, or experience.

Once the assignment has been formulated, there are also the options of giving a particular time limit for writing the paper, whether or not to provide a spell checker or to allow the students to write a plan or outline. In addition, there are options concerning how many revisions (submissions) can be made, whether or not to display a wide range of feedback to the students, and when the assignment begins (date and time), and when it ends. They then register using a login code which takes them to a particular class. Students then input their names, passwords, and email addresses. Evaluations can be emailed to them. Once they are registered, they can open the assignment and begin either with a plan or the actual composition. They have options

of save and finish later, or submit. In short, the advantages are as follows:

1. This fast and easy tool can help students improve their writing.
2. It provides immediate diagnostic feedback in grammar, spelling, mechanics, usage, style, and organization and development.
3. It offers unlimited and convenient access providing there is an internet connection.
4. It allows instructions to focus efforts on the core areas that need improvement to concentrate on higher-level writing skills.
5. It reduces classroom time spent on teaching writing fundamentals.
6. It provides both student and group reports for two kinds of valuable performance data.
7. It stores online student portfolios with two-way instructor/student interaction capabilities.
8. The program offers eight templates for students to plan and organize their ideas for the 190 essay topics at various levels of difficulty along with the necessary essay prompts for students.
9. 170 essay topics are available for lower-level students.
10. Teachers can generate their own assignment through a text editor.
11. There is an online Writer's Handbook for additional writing guidance, and students are able to have teachers' feedback (via pop-up notes) and personalized comments emailed to them.

Appendix B

Criterion's feedback

Below is an example of the feedback and evaluation concerning one student paper. The topic, argumentative in nature, is stated below, and the paper follows.

Question: New technology can solve problems, but it often creates new problems. The invention of the automobile, for example, created the need for speed limits, driver's licenses, and traffic lights. Can you think of an invention that created problems when it was introduced? How were these problems solved? Explain your position with reasons and examples from your own experience, observations, or reading.

Table 1. ETS's Holistic Scoring

Holistic Score:		2 out of 6
<p>Trait Feedback Analysis: You have work to do to improve your writing skills. You probably have not addressed the topic or communicated your ideas effectively. Your writing may be difficult to understand. In one or more of the following areas, your essay:</p> <ul style="list-style-type: none"> • Misunderstands the topic or neglects important parts of the task • Does not coherently focus or communicate your ideas • Is organized very weakly or doesn't develop ideas enough • Generalizes and does not provide examples or support to make your points clear • Uses sentences and vocabulary without control, which sometimes confuses rather than clarifies your meaning 		
Grammar:	11 errors	6 Fragment of missing comma 4 Subject-verb agreement 1 Ill-formed verbs
Usage:	31 errors	1 Wrong article 28 Missing or extra article 2 Preposition error
Mechanics:	12 errors	10 Missing final punctuation 2 Capitalize proper nouns 1 Missing final punctuation 1 Missing commas
Style:	17 comments	5 Sentences beginning with coordinating conjunctions 12 Too many short sentences

Essay

As of today, we use many **I1** machines of new technology. New technology is very **I2** convenience and makes me happy. But it may cause new

various **I3** problem. For example cell phone is. Cell phone is very **I4** convenience. If you have cell phone, you can send e-mail, call, use internet anywhere anytime. At present I think most japanese people have cell phone. Also cell phone that has camera, TV and music player function exist. But cell **I5** phone have also bad points. These days there is problem that **I6** internet depending to young people. This problem cause to be short communication, not to play outside. Also there are sites on the **I7** internet to meet people. It is very dangerous those sites cause many crimes. I think cell phone is good goods, so we must jude to use interneet one by one. Car is **I8** very **I9** convenience thing. I ride **I10** car to go to **I11** kyusyu institution of technology every day. I watch many **I12** car in road. Many people ride **I13** car to go anywhere almost everyday. If you have driver license and car, you can go to place that anywhere anytime. But car causes many problems. First, there is problem that hold up in the morning and in the evening. I think people use the public facilities for travel to solution this problem. And people **I14** don't feel displeas **I15** morning and evening. The second, there is problem that the global environment. For example, global warming and air pollution. Global warming is phenomenon to rise temperature on the earth. This phenomenon cause to rise sea level and change ecosystem. To rise sea level may have been sinked small island in the ocean pacific. To change ecosystem may have been vanished many animals. But cause of global warming is not only car but also to use redundant electricity. Advane nation like **I16** japan wastes of electricity and resource. I think people should walk as many as possible and not use car. Also I think people save many things. Idea of "mottainai" shold cherish more. So **I17** environment of earth get good. Various problems may **I18** solution.

Note: The numbered symbols are used as Criterion's error markers.

Appendix C: Graphical results for grammar, mechanics, usage and style

Appendix D: Error Feedback and Composition Preparation

These appendices are available from the online version of this article at <jalt-publications.org/tlt/>.

Appendix C

Graphical results for grammar, mechanics, usage and style.

The graphs give information on errors concerning specific criteria (i.e, wrong article, missing or extra article, confused words, and wrong word forms). There is also a handbook, which gives information and tips for those students rewriting papers for them to better interpret the feedback.

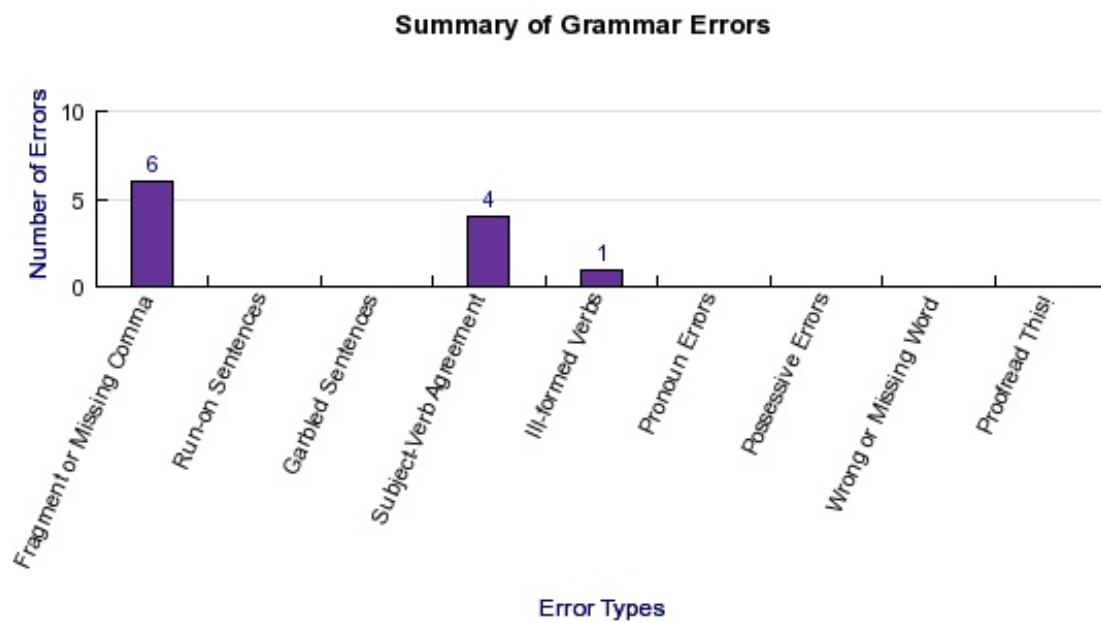


Figure 1. Summary of Grammar Errors

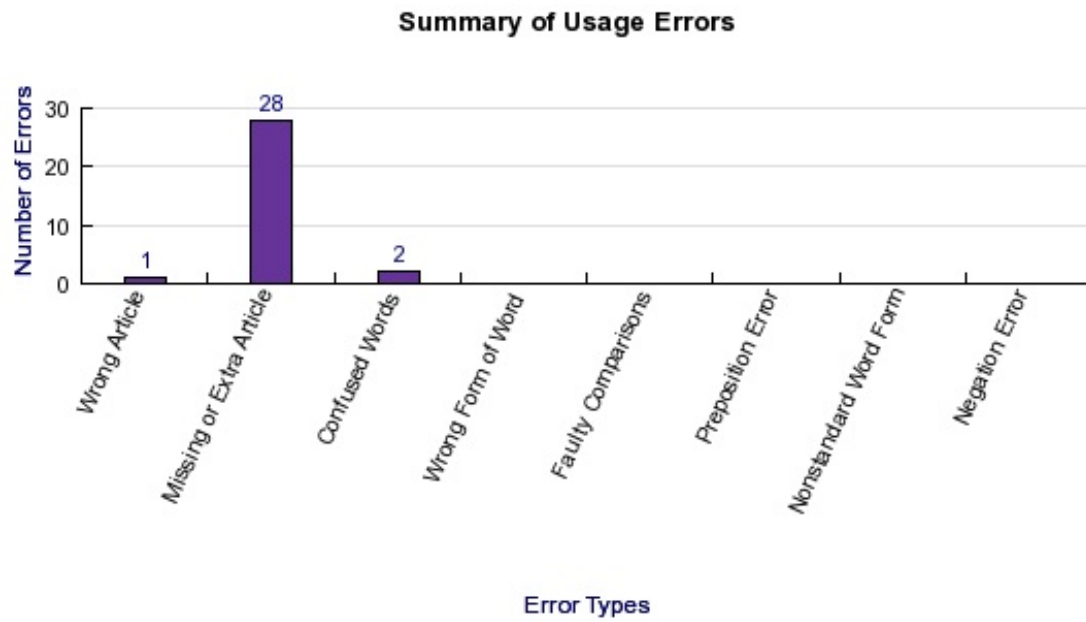


Figure 2. Summary of Usage Errors

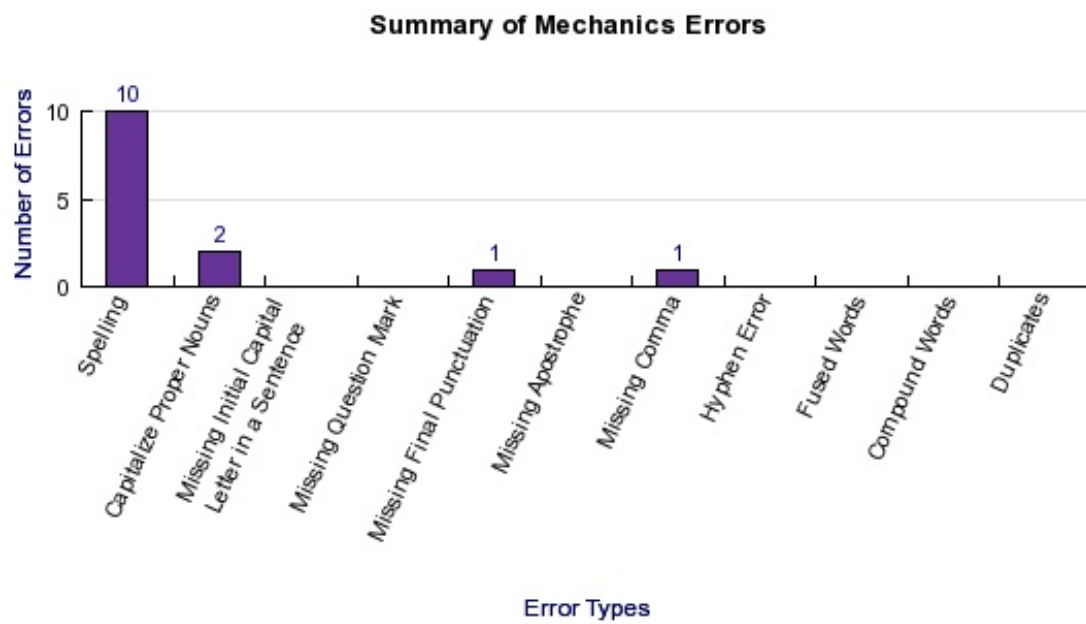


Figure 3. Summary of Mechanics Errors

Usage Errors							
Wrong article							
Missing / extra article							
Confused words							
Wrong form of words							
Faulty comparisons							
Preposition errors							
Nonstandard words							
Negation error							
Mechanics Errors							
Spelling							
Capitalize proper nouns							
Missing initial capital letter							
Missing question mark							
Missing final punctuation mark							
Missing apostrophe							
Hyphen error							
Fused words							
Compound words							
Duplicates							
Style Errors							
Repetition of words							
Inappropriate words / phrases							
Sentences beginning with Coordinating							

Conjunctions							
Too many short sentences							
Too many long sentences							
Passive voice							
Total errors							

My 5 most serious problems in the *first three* papers are:

1. _____
2. _____
3. _____
4. _____
5. _____

For paper 4, my goal is to

My 5 most serious problems in *paper four* are:

1. _____
2. _____
3. _____
4. _____
5. _____

For paper 5, my goal is to

My 5 most serious problems in *paper five* are:

1.

2.

3.

4.

5.

For paper 6, my goal is to

My 5 most serious problems in *paper six* are:

1.

2.

3.

4.

5.
