The Luddite Exam: Not Using Technology to Gauge Student Writing Development

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Abstract

This paper describes a process – nicknamed the Luddite Exam – that can help remedy two difficulties in gauging student writing development: dependence on word-processing software and Internet-enabled plagiarism. The exam is used in a junior/senior-level technical-communication course required of all engineering undergraduates at Mississippi State University. At the end of the semester, students write a short technical document in response to an engineering-based writing prompt/case study. Students read the prompt for the first time at the exam (without access outside of class), analyze it, and write the required document within a standard three-hour timeframe using only a pen or pencil, paper, their course textbook, a dictionary, and the prompt's information. Results from several semesters' worth of data suggest that the Luddite Exam is an effective tool for determining the extent to which student writing ability may have improved over a given span of time.

Introduction

While most current students use some form of computing technology to generate their written documentation, this same technology can make accurate evaluations of student writing development difficult for two reasons: (1) Students become overly dependent on grammar- and spell-checking software programs, which are often fallible and can hamper proofreading/editing abilities; and (2) The Internet provides countless possibilities for plagiarism in most writing situations, thereby severely hindering any chance of an accurate assessment.

This paper discusses a case-study-based writing exam, written by hand during a three-hour exam period, that gauges the writing development of engineering students. The exam is primarily used in a junior/senior-level technical-communication course required of all undergraduate engineering students at Mississippi State University. At the end of the semester, students receive a narrative case study as their final exam; they see this case study only when they arrive at their assigned three-hour exam time, meaning they cannot do any specific work on the exam beforehand. The case study describes a realistic workplace scenario rooted in some field of engineering (or possibly science) and places the reader directly into the scenario as the writer (e.g., "You are a junior engineer at…"). Ultimately, the case study requires students to write one or more documents to help resolve a particular need or problem in the scenario, basing their writing, obviously, on the details in the narrative. Students write their documents by hand using only the case study itself, their textbook, and a dictionary. In this way, the Luddite Exam is a pure writing sample: an exercise requiring students to write a document without the possibility of outside assistance, on a topic for which they have been unable to prepare anything in advance, using and applying the communication-related knowledge they have hopefully gained during the past semester's experiences.

The Luddite Exam topic was originally delivered as a poster presentation at the ASEE 2007 National Conference in Honolulu. This paper expands on that previous version by analyzing

several more semesters' worth of results, which further edify the initial conclusion that the Luddite Exam is an effective instrument for assessing engineering student writing. Also discussed below are several limitations of the Luddite Exam along with ideas for future use.

Research Questions

In analyzing the effectiveness of the Luddite Exam, we sought to answer two specific questions:

1. How can we reliably gauge student writing development over time?
2. How can we do so in a controlled, fair setting?

Why answer these questions?

- *To Measure Student Performance* – How well do students write once they complete their degree program?
- *To Gauge Student Progress* – How much have students' writing abilities improved during their program of study?
- *To Ensure Graduate Proficiency* – To what extent can we be sure that graduates' writing skills will meet prospective employers' expectations?
- *To Assess Program Effectiveness* – Is our curriculum achieving its objectives? In particular, are we successfully addressing ABET criterion 3. (g), and, depending on the case study used, criterion 3. (f)?
- *To Improve Communication Pedagogy* – Are we continuously improving our communication pedagogy by, in part, making sure we prepare students sufficiently to write specific types of engineering documents, such as those required by the Luddite Exam?

Why ***Not*** Use Technology?

Few would argue that innovations in computing technology have not helped the writing process in many ways (increased flexibility in drafting, editing, and collaborating; almost boundless remote access to countless research materials; and so on). However, all this innovation also creates distinct disadvantages when it comes to assessing student writing effectively. The following problems are especially troublesome.

- The enormous amount of electronic text available via the Internet creates endless opportunities for plagiarism. The near-ubiquity of wireless access makes this problem even more acute, particularly in testing situations like the one described in this paper.
- Though undeniably useful, the spell-checking and grammar-checking functions in most word-processing software can hinder students' abilities to check spelling and grammar on their own. The fallibility of software in these situations means students must still maintain some level of unaided proofreading skill.
- The same technology that makes research materials more accessible can also make writing assignments themselves more accessible; for testing situations where teachers want to ensure the security of the assignment materials, this is a major concern.

Most of the issues described above are necessary evils for routine writing, evils that many instructors tolerate due to logistical constraints or attempt to ameliorate via tools like Turnitin.com. The Luddite Exam, though, represents one setting where these evils can be held at bay.

What Does *Luddite* Mean?

Luddite describes a "[m]ember of organized groups of early 19th-century English craftsmen who surreptitiously destroyed the textile machinery that was replacing them…. The term **Luddite** was later used to describe anyone opposed to technological change" [1]. (Our program, by the way, contains no Luddites. We simply think the name is apt and attention-getting. We do actually embrace technology!)

Approach

Our approach to creating and administering the Luddite Exam can be summed up by the following four concepts:

1. ***Application*** – Allow students to apply what they have learned during the semester.
2. ***Purity*** – Ensure their work is untainted by outside sources or inappropriate reuse.
3. ***Reuse*** – Restrict exam materials for reuse and purity; most instructors will not have an endless supply of suitable case studies, so some amount of reuse is necessary.
4. ***Fairness*** – Weight "capstone" documents fairly; that is, make sure the final-exam document does not count too heavily toward students' overall semester grade since, admittedly, the exam is written in an unfamiliar, nonstandard setting.

Methods

Our methods in administering the Luddite Exam are as follows:

1. We prepare students by explicitly describing the exam requirements in an online PDF, by discussing the exam setting itself prior to administration, and by using case studies for in-class assignments before the exam.
2. We allow students to use their own copies of required textbooks and their own dictionaries (but nothing else).
3. We control content by providing the case study (see Figure 1 below) only at the exam, not beforehand.
4. We require students to write their exams by hand (as explained above) to eliminate the possibility for outside help.
5. We monitor students closely during the exam, assisting when necessary and appropriate.
6. We require students to turn the case study back in with their exams to keep the exam "pure" and to facilitate reuse.
7. We record the times students submit their exams to monitor how long students generally take for the exam and how much time they do or do not use to proofread.

8. We grade exams with the same type of rubric we use for routine writing (see Figure 2 below).

The Propeller Car: Writing to a Misguided *Reader*

You are an engineering professor at Dulcinea College in Four Sticks, New Hampshire. One morning you receive the following memo through intercampus mail from Sanford Panza, the dean of the school of engineering:

Good morning,

Please review the enclosed letter from Donald Kehoe. He has some exciting ideas for a new type of vehicle we may want to research. Write to him about his ideas, and please copy me on your correspondence.

Thanks,
Sandy

p.s. FYI, Don recently became our newest Dulcinea SOE Alumnus of the Year! This is a great honor.

Reading through Kehoe's letter, you find yourself giggling uncontrollably at the weakness of his ideas for a new vehicle. Kehoe proposes to build a car powered by batteries. A propeller would be mounted on top of the car and connected to a generator. As the electric-powered car drives down the road, the propeller would spin and function as a windmill, turning the generator to recharge the batteries. The car would never need fuel and would have an unlimited driving range, and, in Kehoe's own hopeful words, "This means no more imported oil would be needed, and peace would reign upon the earth."

With your background, you know there are two problems with this – namely, the first and second laws of thermodynamics. In simple terms, the first law states that one can't get any more energy out of a system than what's put into it plus what energy is initially stored in the system. In Kehoe's case, the propeller would have to generate more energy than what is used to force the propeller through the air and make it turn, thus violating the first law. But even if Kehoe's system didn't recharge the batteries (to keep the propeller from having to generate too much energy) but would only use the propeller output energy to drive the car, then the design would violate the second law of thermodynamics. Basically, this law says that no system is 100% efficient. The propeller can never put out as much energy as is being used to drive the propeller, so there will always be energy losses due to friction and there will be a net loss of energy as the car pushes the propeller through the air and the propeller uses the generator to create electricity and drive the car. In the end, the idea just won't work.

Having thought all this through, you now move on to the harder task: telling Kehoe in simple terms why his idea cannot work. In addition to telling him simply, you've also got to tell him delicately: as the dean mentioned, Kehoe is the Dulcinea School of Engineering Alumnus of the Year, and Dean Panza (along with the rest of the college administration) is very serious about keeping alumni happy, especially prestigious alumni like Kehoe. You'll also be sending a copy of your letter to Dean Panza, so he'll read whatever Kehoe reads, thereby making it even more imperative that you write carefully and precisely.

Assignment: Write a letter to Mr. Don Kehoe concerning his ideas for a propeller car, and copy the letter to Dr. Sanford Panza, Dulcinea Dean of Engineering. Format your report according to "13.2 Types of Business Messages" and "13.3 Business Letter Format" in *A Writer's Handbook for Engineers* (the GE 3513 textbook). All the content you need to write this report should be present on this sheet of paper; however, if you happen to know something specific about this topic that will help your writing/solution, feel free to add such information as long as you do not modify the scenario in any way. Although you are free to use the content above without citation (since, in the context of the case study, it's presumed to be your own work), be careful not to simply cut and paste phrases and sentences without modifying them so they suit your writing and the situation well. As explained in class and on the online exam-information page, you must write this exam by hand (no typing or laptops) using either pen or pencil and any type of paper; also, the only acceptable outside resources you may use are *A Writer's Handbook for Engineers* and a book-type dictionary (no sharing with other students). Lastly, you MUST turn this sheet back in with your written exam – failure to do so will result in a zero on the exam (and yes, you may write/make notes on this sheet).

Figure 1. Sample Case Study Used for the Luddite Exam

Propeller Car Rubric

D / 60-69 points (Has a chance of working):

- Has facts straight: correct names for people, places, concepts
- States in some way that the idea won't work
- Is divided into more than one paragraph
- Does not destroy readers' confidence with numerous grammatical/mechanical errors

C / 70-79 points (Is likely to work, with some difficulties):

- Introduces document well
- Attempts some basic letter layout
- Provides some explanation for why the car won't work
- Has few grammatical/mechanical errors (especially serious ones – see **B** below)

B / 80-89 points (Is under control of reader, facts, structure, and language):

- Exerts proper control over structure: good intro & close, good paragraph development
- Provides plenty of details for why car won't work (2 laws of thermodynamics)
- Avoids a condescending tone
- Has very few grammatical/mechanical errors, especially serious ones (subject-verb agreement, sentence fragment, comma splice, misspellings, incomprehensibly mixed constructions, etc.)

A / 90-100 points (Is clear, efficient, convincing, and a pleasure to read):

- Tone, design, and extent of details beyond reproach: excellent introduction, details, transitions, and structure
- If applicable, provides suggestions for modification without obscuring the bad news
- Uses a style wholly suitable for the readers (handles delicately without kissing up)
- Has very few grammatical/mechanical errors, especially serious ones

Figure 1. Rubric Used to Grade the Luddite Exam

[NOTE: The sections below are unfinished. We are awaiting more data to complete our analysis.]

Findings

From fall 2005 through fall 2008, grades increased on the Luddite Exam compared to documents written in unrestricted settings. Table 1 below shows this data.

Table 1. Student Averages on Papers Compared with the Luddite Exam Fall 2005-Fall 2008

	*Paper Averages**	*Exam Averages*	*Difference*
Fall 2005 (43 students)	80.82	80.89	+ **0.07**
Spring 2006 (51 students)	83.63	85.1	+ **1.47**
Summer 2006 (37 students)	85.36	88.01	+ **2.65**
Fall 2006 (25 students)	82.43	86.01	+ **3.58**
Spring 2007 (29 students)	86.15	91.9	+ **5.75**
Summer 2007 (23 students)	83.19	83.01	**-0.18**
Fall 2007 (47 students)	87.48	91.7	**+4.22**
Spring 2008 (39 students)	87.79	83.36	**-4.43**

Summer 2008 (39 students)	88.14	86.76	**-1.38**
Fall 2008 (50 students)	84.7	TBA	**TBA**

*Scores are out of 100 possible points divided according to standard letter-grade breakdowns: A = 100-90, B = 89-80, C = 79-70, D = 69-60, F = 59-0.

Conclusions and Limitations

The Luddite Exam is an effective way to gauge student writing development over time. The consistent increase in student performance likely stems from enhanced student ability as well as increased instructor skill in preparing students for the exam.

Future Work

- Implement the Luddite Exam programmatically/outside the specialized course (already begun).
- Formally survey student perceptions on the exam's usefulness.
- Enable computer use on the exam without affecting the major objectives.

References

[1] "Luddite," in *Britannica Concise Encyclopedia*, June 19, 2007. [Online.] Available: http://www.britannica.com/ebc/article-9370681