

Reflection in a Technical Writing Course: Students Assess their Progress

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Abstract – Technical Writing is a writing-in-the-disciplines (WID) course, focusing on transactional writing. Writing-to-learn (WTL) activities are not typically associated with WID courses because they focus on student learning rather than professional practice. However, WTL activities can serve a valuable function in a WID course. This paper describes the use of a three-part reflection exercise in a technical writing course. On the first day of class, students were asked to submit a brief writing sample. Near the end of the semester, the students' responses were returned, and students were instructed to critique them using the skills they had developed during the semester. Most students made detailed comments about opportunities for improvement, showing their ability to internalize the feedback they had received. While WID courses must focus on writing for a particular audience, WTL activities can remind students that the writing process provides a lifelong opportunity for personal growth through self-assessment.

Keywords: writing to learn, writing in the disciplines, technical writing, reflection

WRITING-TO-LEARN PEDAGOGY

Writing across the curriculum (WAC) broadly describes the programs and pedagogical theories that support the connection between writing and learning. In post-secondary education, WAC programs view writing as an important component of learning in any discipline, rather than the sole domain of the English department. The WAC movement began on U.S. college campuses in the 1970s, when the student population was becoming more economically and socially diverse, highlighting the need to provide comprehensive writing instruction to all students regardless of background or field of study [1]. While the movement flourished in small colleges due to smaller class size and close relationships among faculty in diverse disciplines, it was more difficult to implement in large research-based institutions. However, it began to spread widely in the 1980s, with initiatives at George Mason University, the University of Michigan, and Colorado State University. These initiatives typically began with workshops designed to train faculty from a variety of disciplines in writing strategies that can be adapted for any course [1].

As universities began to apply WAC pedagogy to their unique goals and needs, two different approaches developed: writing to learn (WTL) and writing to communicate, now known as writing in the disciplines (WID). WID focuses on instruction in the specific disciplinary conventions and genres of a field of study. The main argument for WID is that students are learning to be members of a particular discourse community, so they must learn to speak the language of that community. Therefore, writing is a part of the student's transition from the academy to the professional world. The writing assignments in WID courses are typically transactional, meeting a particular goal for an identified audience, which means that students are taught to write not for themselves, but for that audience [2]. In contrast, WTL strategies allow the student to write for him/herself. The main purpose of a writing assignment, then, is not to communicate information, but to understand the information. Such assignments are typically short,

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informal, and ungraded. They include prewriting and free-writing exercises, journals, reading notes, and reflections. As students write their ideas, analyze readings or class discussions, or reflect on their own learning processes, they are employing the higher order critical thinking skills that are necessary for mastery of any discipline [3].

Because these two approaches emphasize different writing goals, they are often characterized as divergent. However, the literature suggests that “the philosophies are compatible,” and when approaches are integrated, learning is enhanced, not diluted [4]. McLeod further asserts that WID courses should not “by definition leave out writing to learn” [4]. In fact, because WID is often the focus of upper-division courses, transactional assignments present a valuable opportunity to develop “critical thinking skills that define the various disciplines” [4]. In engineering courses, which often focus on problem solving, WTL activities can enhance student understanding of the course material. In 2004, the Rose-Hulman Institute of Technology attempted to add WTL assignments to an engineering statics course. As they completed homework problems, students were asked to describe the processes they used to solve the problems so that their fellow students could understand them. By definition, the students were practicing transactional writing because they crafted their descriptions for a particular audience, but the main goal of the assignments was to allow them to reflect on their own understanding and identify areas of confusion. This integration of communication and reflection contributed to improved student performance in the course [5].

REFLECTION EXERCISE

GE 3513 Technical Writing is a transactional writing course for junior and senior engineering students at Mississippi State University. As with most WID courses, the assignments require students to practice the genres they are likely to encounter in the workplace: technical descriptions, research reports, lab reports, proposals, and instructions. Throughout the course, audience expectations are emphasized through instruction in style, diction, design, and organization. For each major paper, students write two drafts to allow them to receive feedback and revise. The first draft is shared in a group workshop, where students receive feedback from their peers and the instructor. Students are given a rubric to guide them as they analyze the drafts. As this process is repeated throughout the semester, the goal is for students to internalize the feedback and learn to apply the same process of analysis and revision to any writing situation. For this internalization to be successful, students must recognize their individual strengths and weaknesses as writers. They must also understand that their growth is a long-term process, which should extend well beyond any single course. In fact, as they progress in their careers, they will need to continue to improve to meet increasingly complex writing demands. To support this growth, a three-part reflection exercise was added to the course. It was intended to serve two main purposes: 1) to allow students to assess their own progress over the semester and 2) to challenge students to analyze their strengths and weaknesses without feedback from their classmates or instructor. To motivate students to give their full effort, the exercise was designed as an extra credit opportunity, worth up to 5 bonus points on the final exam grade for a thorough, detailed reflection.

Part 1

The exercise began on the first day of class. Students were asked to respond to a prompt during an in-class writing session (Figure 1). They were told they would have the chance to analyze their writing samples near the end of the semester to earn extra credit. The envisioned audience for this prompt is a non-expert, which presents an interesting challenge for many upper-division engineering students. They are often so accustomed to writing for their peers or engineering instructors that they struggle to explain concepts clearly to a reader outside their discipline. This challenge is designed to introduce them to the process of considering what their audience knows and needs to know. The reflection exercise, then, represents both WAC and WID approaches. Students focus on the audience for the first part of the exercise, but as they revisit their writing later in the semester, the goal shifts to self-analysis. The instructor collected the responses, made copies, and wrote comments on the copies. The instructor kept all responses and copies during the semester.

First-Day Writing Sample

In one or more paragraphs, respond to **one** of the following prompts about your field and interests. Tailor your writing to a college-educated reader who possesses no specialized knowledge of any technical topics you discuss.

1. Introduce a technical/scientific topic to your reader in a way that is both informative and interesting.
2. Imagine that it is 2025, and you are at the peak of your chosen career. With as many details as possible, explain the challenges and rewards of your job.
3. Consider how a current news item or topic of interest is connected to your field in some way. How can your field help define it/solve it/develop it?

Figure 1. Writing Sample Prompts

Part 2

Near the end of the semester, the original writing samples (without comments) were returned to students. In preparation for the exercise, students were instructed to review all the writing they had submitted over the semester, paying particular attention to their strengths, weaknesses, and growth. Students were given an entire period to analyze, comment on, and revise their samples using a simplified version of the rubric they had used during the paper workshops (Figure 2).

Rubric for Writing Sample

As you comment on your writing sample, use these questions as a guide:

1. Does the description clearly address the question for a non-expert reader?
2. Does the description include appropriate facts, examples, and reasoning to support and illustrate all points?
3. Do the word choice and sentence structure suit the situation?
4. Is the paragraph free of grammar/mechanical errors that slow reading or affect credibility?

Figure 2. Rubric for Analyzing Writing Sample

At the end of the period, the samples were collected again. Student responses were reviewed and compared with instructor comments. Figure 3 is a student response, and Figure 4 is the instructor response for the same sample.

In one or more paragraphs, respond to one of the following prompts about your field and interests. Tailor your writing to a college-educated reader who possesses no specialized knowledge of any technical topics you discuss.

1. Introduce a technical/scientific topic to your reader in a way that is both informative and interesting.
2. Imagine that it is 2025, and you are at the peak of your chosen career. With as many details as possible, explain the challenges and rewards of your job.
3. Consider how a current news item or topic of interest is connected to your field in some way. How can your field help define it/solve it/develop it?

1 COMPLETELY VALUE & NOT PRECISE

AS TIME HAS GONE BY, CARS HAVE BEEN GETTING FASTER AND FASTER. ENGINEERS HAVE BEEN COMPETING TO MAKE THE FASTEST ENGINE. RADICAL INNOVATIONS ARE BEING MADE TO CREATE AND DESIGN THE ULTIMATE ENGINE; TO CREATE THE OPTIMAL ENGINE. RECENTLY, ENGINEERS HAVE HIT A ROAD BLOCK, BECAUSE FORMULA ONE ENGINES OPERATE AT SUCH A HIGH RPM, THE INLET AND EXHAUST VALVES ACTUALLY COLLIDE WITH THE PISTON.

AS IT TURNS OUT, THE SPRINGS THAT RETRACT THE VALVES ARE NOT ABLE TO RETRACT THEM FAST ENOUGH. A NEW CONCEPT BEING TESTED IS INCORPORATING MAGNETIC LEVITATION TECHNOLOGY INTO THE VALVES. THIS WILD IDEA ELEVATES THE LIMITATIONS THAT THE SPRING SYSTEM HAD.

2 REITERATION, REMOVE

3 INFORMAL

4 SHOULD BE COMBINED W/ PREVIOUS SENTENCE

5 UNCLEAR, SHOULD BE VALVE RETENTION MECHANISM

OVERALL, NEEDS TO BE FAR MORE CONCISE. ALSO HAS MANY INFORMAL PHRASES
EXAMPLE OF REWRITE:

AUTOMOTIVE ENGINEERS IN FORMULA ONE RACING ARE AS COMPETITIVE AS THE DRIVERS. A RACING TEAM GAINS AN ADVANTAGE WHEN INNOVATIONS ARE MADE TO THE VEHICLE. MAGNETIC LEVITATION TECHNOLOGY IS A RECENT INNOVATION INTO FORMULA ONE THAT ALLOWS CARS TO OPERATE AT A HIGHER ROTATIONS PER MINUTE (RPM).

BETTER INTRODUCTION

Figure 3. Original Student Sample with Student's Comments

In one or more paragraphs, respond to one of the following prompts about your field and interests. Tailor your writing to a college-educated reader who possesses no specialized knowledge of any technical topics you discuss.

1. Introduce a technical/scientific topic to your reader in a way that is both informative and interesting.
2. Imagine that it is 2025, and you are at the peak of your chosen career. With as many details as possible, explain the challenges and rewards of your job.
3. Consider how a current news item or topic of interest is connected to your field in some way. How can your field help define it/solve it/develop it?

Transition
These sentences could be combined
AND FASTER
 AS TIME HAS GONE BY, CARS HAVE BEEN GETTING FASTER AND FASTER. ENGINEERS HAVE BEEN COMPETING TO MAKE THE FASTEST ENGINE. RADICAL INNOVATIONS ARE BEING MADE TO CREATE AND DESIGN THE ULTIMATE ENGINE; TO CREATE THE OPTIMAL ENGINE. *either redundants or contradictory*
 RECENTLY, ENGINEERS HAVE HIT A ROAD BLOCK. BECAUSE FORMULA ONE ENGINES OPERATE AT SUCH A HIGH RPM, THE INLET AND EXHAUST VALVES ACTUALLY COLLIDE WITH THE PISTON. AS IT TURNS OUT, THE SPRINGS THAT RETRACT THE VALVES ARE NOT ABLE TO RETRACT THEM FAST ENOUGH. A NEW CONCEPT BEING TESTED IS INCORPORATING MAGNETIC LEVITATION TECHNOLOGY INTO THE VALVES. THIS WOULD IDEALIZE THE LIMITATIONS THAT THE SPRING SYSTEM HAD. *Some background on how the engine works would be helpful.*
Sp
A few more details would give the reader a more complete picture of this technology.
Avoid clichés. (I appreciate the pun, though)

Figure 4. Copy of Student Sample with Instructor’s Comments

These samples indicate similar notes in two main areas: preciseness and professionalism. Figure 3 shows the student’s recognition that idioms such as “road block” are too informal for professional writing. The student also demonstrates an understanding of the importance of using concrete details and avoiding redundancy. For example, the student notes that the topic sentence, which begins with the phrase, “As time has gone by,” is “vague and not precise.” The student’s suggested revision for the first three sentences is more formal and detailed. The student also suggests combining similar sentences to make the paragraph more concise and coherent. Although the student did not note the spelling error (“Eleviates”), the revision demonstrates an awareness of the most important tenets of technical writing and, more importantly, the skill of applying those tenets to a piece of writing.

Many student revisions included similar comments about style. In a different student's revision sample (Figure 5), the student made marginal comments and then added a note on the back of the page describing the sample's general lack of professional style.

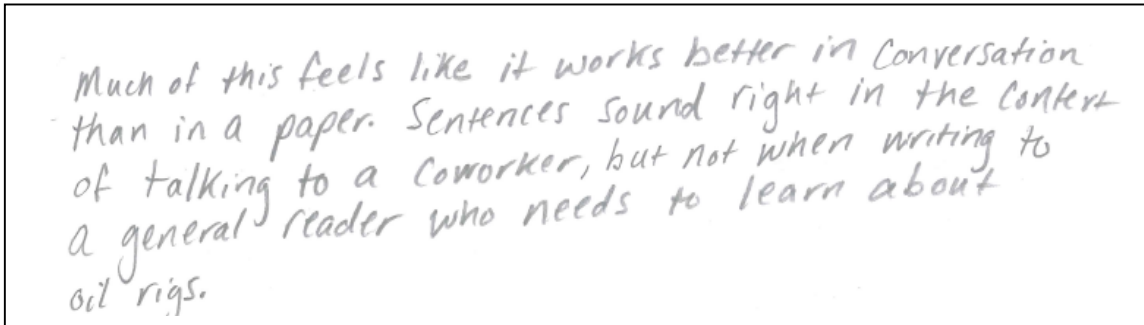


Figure 5. Student Note on Original Student Sample

The importance of considering audience and purpose is discussed at length throughout the semester, but discussion of concepts is only useful if students can apply them. Like the previous sample, this note demonstrates the student's ability to connect these principles to his own writing.

Part 3

On the last day of class, both the student-marked original and the copy with the instructor's comments were returned to students, and they were asked to compare both sets of comments. Class discussion followed, with students asking questions about the differences and often expressing surprise at the similarities between the comments they gave and those of the instructor. The discussion provided another opportunity for reflection, as students shared concerns about areas in which they still struggled and satisfaction at their progress. As the discussion continued, it shifted to preparation for the final exam, which requires students to write a report during the exam period. It is often difficult to review for a final exam in a writing class because there are no problems to demonstrate. Instead, students must rely on skills they have developed over the course of the semester. This exercise allowed them to ask direct, focused questions about their individual challenges. Students were reflecting on the course in general, but more importantly, on their own progress as writers.

DISCUSSION

When instructors make detailed, constructive comments on student papers, they hope students read and analyze them, carefully considering how to improve for the next assignment. However, without any follow-up, some students might simply view the grade and move on. This reflection exercise, with its promise of extra credit, gave students an incentive to see each piece of writing as part of a portfolio that represents their individual struggles and strengths as writers, as well as their growth over the semester. While some students made only brief, shallow comments, many demonstrated a remarkable understanding of their unique challenges. Seeing the similar instructor comments could encourage these students to trust their own voices to self-assess effectively and routinely. This exercise should also lead to reflection for the instructor because commonly missed errors can reveal areas of weakness in course instruction; the students may not be hearing the message the instructor intends. In this way, the exercise is a learning opportunity for the instructor, leading to improved communication with students in future semesters. In future applications of this exercise, a two-part survey will be added that asks students to assess their writing skills and their confidence in identifying their strengths and weaknesses as writers. If students complete the survey along with the first-day sample and again at the end of the course when they complete their revisions, the effects of the exercise on student growth and understanding can be measured.

In a WID course, the focus must remain on professional practice, so instructors are understandably hesitant to incorporate WTL activities. However, their informal, short nature enables instructors to use them on a small scale and then increase or decrease the frequency and weight of the activities. Any upper-division, discipline-specific course could incorporate a similar reflection activity. Instead of the students reflecting on their writing skills, they

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could reflect on their understanding of the course's technical content. The activity requires two full class sessions and a portion of the last class meeting for discussion, but instructors should see the activity as adding to student understanding rather than taking away valuable course time. In typical lecture classes, students are often expected to passively absorb course content. However, as they move into the professional world, they will be required to play an active role in assessing their progress and finding ways to improve. WTL activities, such as reflection, can be used as practice sessions for this self-directed learning.

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