

USE OF A TRIPLE-ENTRY JOURNAL ASSIGNMENT IN A WRITING INTENSIVE MICROBIOLOGY COURSE SECTION TO HELP STUDENTS TO READ AND WRITE MORE EFFECTIVELY

Julie Trachman

“When we make students struggle with their writing, we are making them struggle with thought itself ... Often the struggle of writing, linked as it is to the struggle of thinking and to the growth of a person’s intellectual powers, awakens students to the real nature of learning.” (Bean xiii).

INTRODUCTION

Many individuals in academia have recognized the benefit of having students become more effective writers, irrespective of the discipline, through what is called the “Writing Across the Curriculum” (“WAC”) initiative (Bean 15; Harris and Schaible 31; AACU 12). It has even been promulgated that the writing process itself, if properly designed, can help the student understand course content better and become more adept at critical thinking in what is sometimes referred to as “writing to learn” (Bean 2; Fisk 182; Elbow 1; Elder and Paul 2). This includes the science disciplines (Yore 105). However, it has been noticed that many American students in the recent past have been lacking in their ability to communicate via writing (The National Commission on Writing in America’s Schools and Colleges 9; Lewin A15).

The “WAC” movement has had its goal for a number of years to improve the writing of American students. At least 638 college and university campuses in the United States (Thaiss and Porter) have implemented changes in their curricula to address the poor writing abilities of American students (Bean 15; Harris and Schaible 31). In the recent past, the movement has gained proponents with the realization that our students need to excel at written communication for the U.S. to continue being a dominant force in the global economy of the 21st century (The National Commission on Writing in America’s Schools and Colleges 11; Friedman 309; AACU 12). A recently conducted survey of the American populace sponsored by the National Writing Project clearly indicates that the American populace understands the importance of writing in the education process regardless of subject matter (Belden, Russonello, and Stewart Research and Communications 2).

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Although I was not too familiar with the “WAC” movement before joining Hostos in 2004, I inherently knew that writing benefitted student learning and I had been giving students writing assignments in almost all of my previously taught classes, although type and scope varied considerably. Writing of lab reports and the answering of straight-forward questions regarding course material were performed with some success by the majority of the students. With these assignments, I was mainly looking for the ability of the student to explain what they accomplished in lab or correctly correlate information with the questions without much concern as to whether they could provide answers completely in their own words, respectively. However, I routinely encountered difficulties when I assigned students to write term papers or create summaries of research articles or other scientific texts. Briefly, I noticed that most students (at least 90%) have difficulties in paraphrasing (i.e. writing in their own voice) and this inability prevented the student from properly writing summary statements of one text. If the students were asked to write a research paper, the lack of ability to paraphrase was again problematic. It was further complicated by the fact that students did not know when they needed to cite references or in some cases were not able to generate a proper bibliography. From discussing these problems with colleagues, I knew I was not alone in my frustrations. A literature search done in preparation for this article confirmed that the problems I encountered with my students’ writings are found on many U.S. and international campuses (Roig, “Students Determine Whether Text is Plagiarized”, 113; Roig, “Avoid Plagiarism”; Intronas and Hayes 83).

In spring 2005, I was introduced to the triple entry journal format at a junior faculty orientation session described in more detail by B. Wissinger in the *Hostos publication* "Making Meaning, Making Sense" (29). I recognized that this might be the solution to some of my problems and decided to implement this assignment immediately in the Writing Intensive (WI) Bio 3904 General Biology 2 class that I was teaching, where yet again I was experiencing student difficulty with the task of summarizing an assigned New York Times article from the Science Times section. The two page article was entitled "Minds of Their Own: Birds Gain Respect" (Blakeslee F1) and I asked the students to summarize the information provided to them in the text that suggested that birds were much intelligent than previously given credit for. I gave my students an opportunity to restructure their writing to fit into this new format. The students, using the triple entry journal format, were asked to create a chart whereby they had to identify several specific quotes from the article and then paraphrase the quote as well as explain why they believed the chosen quote supported the author's belief that birds were more intelligent than originally believed. Several students opted to redo their assignment and I saw they were now able to demonstrate real understanding of the article, not evidenced when they were just piecing together "snippets" of sentences from the original article with an occasional change of wording or what is sometimes referred to as "patch-writing" (Roig, "Avoid Plagiarism"; Intronas and Hayes 83).

Based on my experiences with the WI Bio 3904 class, when designing my WI Bio 310 Microbiology class with the help of my assigned writing fellow (Randol Contreras), I decided to design a "staged" assignment incorporating a triple entry journal formatted assignment and the staged assignment would be used as early in the semester as possible for students to receive the maximum benefit. Additionally, because the WI courses give students the opportunity to write rough drafts first and revisions afterwards, we decided that the triple entry journal assignment was a perfect

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approach. The triple entry assignment, used as a low stakes assignment, would lead to students being asked to write a summary (a high stakes assignment), thus providing the students with some scaffolding to help them carry out this more difficult task. I felt with the structure of this staged assignment, student writing would improve on several levels and also importantly, it would improve students' critical thinking skills. By forcing students to actively engage in a text to cull out three important points, rewrite the salient points in their own words and then relate these points to information they should already be familiar with and then use their logic to explain why these points are germane, the students are "struggling with the text" and "learning" something of value, as Bean suggest (Bean xiii; Fisk 182). This staged assignment can also be considered to be a type of generative learning strategy (Thomezcek et al.; Ritchie and Volkl 83), which is useful in improving students' critical thinking skills. By wrestling with these points, the students gain clarity of thought. Unfortunately, most students when not understanding the material often dodge the question(s) they are asked by obfuscation – in other words, vague writing (even if it is beautifully written). As Paul and Elder have shown (2), students start learning how to become "substantive writers" by being asked to practice these types of writing skills, and they start to recognize "the difference between 'style' and 'substance.'"

Additionally, as mentioned above, many students do not properly write summary statements. By extending the triple entry journal assignment further to lead the student to using the information to generate a summary statement, students start learning to more effectively write a coherent statement about the contents of an article by using their own words.

Lastly, all of us have had problems with student plagiarism to varying degrees. There is evidence in the literature (Roig, "Students Determine Whether Text is Plagiarized", 113; Roig, "Avoid Plagiarism"; Intronas and Hayes 83) which proposes that much of the observed student plagiarism is "unintentional" because students do not have good paraphrasing skills and do not even recognize what a well-executed paraphrase is in comparison to poorly written paraphrases. In some cases, students are fearful about "translating" the scientific text into their own words because they are concerned that what they write will no longer convey the original meaning and subsequently, they are afraid their grade will suffer. This "staged" assignment gives the student practice in a setting where this concern about the grade should be

allayed. As the student revises what he or she writes following the provided feedback, the student gains confidence in his or her ability to do this in the future. After carrying out re-visions of their rough drafts, 87 % of the students in my two WI sections were able to write at least part of the summary statement using their own words. By helping students develop these skills, this will help students further down the road when they are called upon to write at length in their own voice. As a result of this exercise, I have seen students make more attempts at paraphrasing in other assignments and I have an easier time getting students to place citations in their “term paper” assignment. With respect to “term papers”, when I compared my two sections of WI microbiology to four previous sections of non-WI microbiology, I found that 84% of students in my WI sections put citations in their papers rather than 40% for the non-WI students. I found that 59% of my WI students were making some attempt at paraphrasing as compared to the 41% seen in the four non-WI sections. The change in the amount of students in attempting to paraphrase is not as large a change as one would hope for but

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it is progress. Additionally, the fact that students are at least acknowledging now where they are obtaining their information from and placing quotes around statements that are not their own is significant progress.

THE STUDENTS

Students enrolled in WI Bio 310 Microbiology are supposed to be concurrently taking English 111 Literature and Composition or have already completed the English requirement. In addition, students are supposed to have taken the pre-requisite of a year-long biology sequence of Anatomy and Physiology or General Biology for science majors. The other Bio 310 sections only require the Biology courses, which require students to have Eng 91 Core English as a pre- or co-requisite. Over the several semesters that I have taught Bio 310 (non-WI and WI), I have found that many of the students taking Bio 310 are Hostos pre-nursing students (full-time or part-time), who are hoping to enroll in the Hostos nursing program or elsewhere. A few of the students are already enrolled in our RN or LPN programs.

The age, nationality and educational backgrounds of the students vary tremendously. Quite a few of the students have completed the Eng 110-Eng 111 sequence (or their equivalent) through the English as a Second Language pipeline. Occasionally, a student has a Hostos degree in another discipline and now is coming back to enter the Allied Health Science professions. A number of students have four year college degrees and are practicing accountants, etc. all wanting to change their professions. I have even had a few students who are practicing lawyers and students with Masters in Social Work, who have been working in the field for a number of years.

THE ASSIGNMENT

The first step in the staged assignment is for students to do a low stakes assignment where they would describe three benefits we human beings incur from having microorganisms in our environment (including us human beings) or at our disposal. They were to use knowledge gained from lecture, textbook and prior experiences from other classes, work, etc. to aid them. This low stakes assignment was collected and reviewed by me in order to give the students some sort of feedback and to get a sense of their abilities. At the time the students were carrying out the first low stakes assignment, the students were handed a three page New York Times article entitled “Aliens Inside Us: A (Mostly Friendly) Bacterial Nation” (Gorman F3) to be read at home which covers a topic related to this first low stakes assignment. The article discusses how we mostly benefit from the presence of many microorganisms in our gastrointestinal (GI) tract with an emphasis on three benefits that we accrue from the mutualistic symbiont *Bacteroides thetaiotaomicron*. Briefly, the three benefits are: a) these bacteria prevent the colonization and / or replication of potential

pathogens in our GI tract b) microbial catabolism of organic molecules, which can not be catabolized by us human beings thereby making more nutrients available to us c) fostering the innervation of small blood vessels in the intestinal lining increasing our ability to absorb nutrients by the GI tract. The first time I used this assignment, the students were asked to select three quotes from this article regarding the specific benefits from *B. thetaiotaomicron*. In the following class, I explained to the students the concept of a triple entry journal as outlined by Wissinger (29). On the assignment sheet that was given to them at the next class session (when they will be carrying out the second step of the assignment),

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an example of how the format is used was provided using the same article but covering a separate aspect of the article (see example below). The triple entry journal format involves three columns of writing and I formatted the page for the students to make the information transfer easier. In the first column, students were asked to write down the three selected pertinent quotes that the student thought related to how *B. thetaiotaomicron* benefitted us. In the second column, they were asked to paraphrase (write in their own words) the information expressed in the three selected quotes. The third column is for analysis with attention paid to why these particular quotes were chosen by the student and how their answers were based on his/her prior knowledge from the textbook, lecture and elsewhere.

Example of Triple Entry Journal using a statement from the second paragraph of the article:

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<p>Quotation</p> <p>“Peach trees and watermelon vines will not grow there, but parasites, worms and cysts will do fine.”</p>	<p>Paraphrase</p> <p>Our bodies will not support the growth of peach trees, etc.; however, various body sites will support the growth of microorganisms that can do damage to its host.</p>	<p>Analysis</p> <p>As we learned from Chap. 1 in the text, the human body can be infected by many different types of microorganisms, including bacteria, viruses, protozoa and</p> <p>and worms which can produce virulence factors that can cause a disease state in the host.</p>
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After evaluating the students’ writing, the assignments were given back to students the following session. I also went through the feedback orally with them some- what generally to discuss many of the commonly made errors and then gave them their first high stakes assignment, which was to take their results and generate a summary (taking into account my feedback when necessary). In some cases, because the feedback suggestions were not successfully followed through by the student, I ended up giving at least twelve students feedback on the summary and then allowed these students to submit the essay again later in the semester if they cared to. Because the triple entry journal assignment using three quotes took more than 30 minutes to perform in class by the students, the second time I tried this assignment, students were asked to only cope with one quote in class. I gave them feedback on the one quote, then asked them to do the second and third at home in triple entry journal format and to generate a summary after that. If they cared to, they had the option of turning in the completed triple entry journal assignment to get feedback before attempting the summary part or receiving feedback on both the triple entry journal and the summary. Then, the student would have an opportunity to resubmit the summary at least one more time.

RESULTS AND DISCUSSION

Given that this was an assignment based on a New York Times article written for the lay public, I was somewhat surprised to see how many students do not display “clarity of thought.” I say this because many of the students have demonstrated difficulty locating all of the three benefits. For example, one student selected appropriate quote 1 “Our internal bacteria help us digest food that otherwise would simply pass through us” (and successfully paraphrased it) and an appropriate quote 2 “They fend off unfriendly bacteria” (and successfully paraphrased it) but was completely flummoxed for quote 3. The student selected “[t]hey function, as Dr. Gordon would say, as an organ.” In some cases, students even have problems addressing the question posed to them. For example, one student in his final summary wrote about the role bacteria play in the food industry by producing amino acids, antibiotics, etc. and went on to talk about yeast involvement in producing bread, beer and wine among other points of information.

In a few cases, students locate the one sentence in the article that covers all three benefits superficially but then have trouble recognizing that they did so and demonstrate difficulty on expanding on it. Even if they find one or more of the benefits in one or more sentences from the article, they have difficulty in putting the sentence in their own words – often “patch-writing” to do so. For example, one student wrote: “Bacteria helps in the digestion of some food that cannot easily pass through our system. It also help in regulating metabolic process. Bacteria helps with the blood flow to the intestine, the growth of a capillary network is initiated by the presence of bacteria.” In addition, in many cases, the student is unable to give a clear cut reason as to why the information in the chosen quote is a benefit to the human being. After getting feedback from me and encouragement to keep looking, many of the students eventually go on to pick at least one more of the acceptable quotes. In my feedback, I try to help the student figure out how to write out a statement that serves as an “acceptable” paraphrase, where there is a significant amount of difference from the original wording. For example, students keep often using the word digest (which was used several times in the article) and I try to get to use substitute words like degrade, metabolize or break down. I also often have to nurse the student along in terms of what is “acceptable” thinking regarding “the why” of what he or she has selected as a benefit. Here I am looking for some sort of logic to their selection. An example where a student went off track on the point regarding capillary network formation in the intestines is as follows: “As we learned in Chap. 14, our large intestine is colonized by trillion of bacterias that if they stayed within their environment they won’t produce any damage, instead they will be benefit, both themselves and the host, by mutualism.” The effort in getting the student to do this accurately parlays into much more precise thinking on the student’s part later in the semester.

Fortunately, the Hostos WI Taskforce has provided us with opportunities to survey the students at the end of both semesters that I have taught the WI Bio 310 course. The Hostos WI Taskforce was willing to share the results with me both semesters and I have compiled the results. The surveys are not specifically asking about this particular “staged” assignment but do ask about the value of both the low stakes and high stakes assignments along with the value that students derived from being able to revise their assignments (this triple entry journal / summary assignment is one of the few assignments where the student has the opportunity to revise).

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FEEDBACK FROM SPRING SEMESTER 2008:

Almost all students (24 of the 26) reported that they felt their writing improved in some fashion - by virtue of both the informal and formal assignments and that the revision process contributed to this improvement. One of the few who did not feel so had self-reported as having a learning disability (but did note that the graded assignments helped him or her “formulate ideas” and the students “had to go deeper.”) Consistent with this, the student felt that the informal non-graded writing allowed him or her “to learn more about the course.” A second person seemed to be under the misimpression that the writing instruction was for helping

with the student's grammar as opposed to helping the student learn the information (see below) and also reported there was improvement in using specific details / examples, understanding the assignment, and deciding what to include.

Some of the comments from the spring 2008 semester that suggested we were achieving the goals of "writing to learn" were:

"Because writing about certain topics help me understand better what was taught in class."

(The informal assignment)... "help me to have a base to do my formal assignments."

"It helped me understand the class material."

"The subject is too heavy. You find yourself more concerned with the information than grammar."

"The more you write, the better you become / practice makes perfect."

"To write about it you have to understand the material."

"I received constructional criticism that helped me get on the right track."

"The information expounded on things I had heard about before but was

unclear."

"Because the assignments make students familiar with the type of microorgan-

isms and the disease in a more practical way."

FEEDBACK FROM FALL SEMESTER 2008:

A majority of the students (13 of the 19 respondents total) felt that the writing instruction benefited them overall. A couple of students were somewhat neutral and five of students felt the instruction did not help; however, one of these negative students did say that he or she would recommend a friend to take the course. It is interesting to note that the students who tended to have negative views regarding the value of the instruction (three students) were the least prepared to take the course with respect to their English course background (either taking Eng 111 at the same time or claimed to only have taken Eng 110 and not taking Eng 111 concurrent with the Bio 310 as they were supposed to). They felt the course was overwhelming for them because its format detracted from their learning the microbiology material. The student who was most consistently negative in feedback (among the five who were felt that their writing did not benefit from the course) did at least report that the course helped in developing his or her paraphrasing skills and in helping him or her to learn how to incorporate quotes from the readings. This student did not report taking any English courses at Hostos and reported only taking 12 credit hours at Hostos. Since some students have college degrees from elsewhere and may only take a few science courses here, it is very possible that this person does not really have the appropriate writing skills background and we

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can not control for this possible lack in regard to his or her educational preparation to take this course.

Some of the comments from the fall 2008 semester that suggested we were achieving the goals of "writing to learn" were:

“The course so far has forced me to widen my vocabulary especially in my day to day conversation. I actually found myself thinking more and wanting to figure out more class material on my own, and overall, though this course is a challenge, I’m enjoying it and look forward to finishing strong.”

“This WI course help me grasp & understand the material better.”

“This course helped my understanding on the topics & concepts of this course.”

Based on the feedback of the students and my own observations, I feel that the

WI microbiology course is achieving its aim to help students to write more effectively by becoming more “substantive” writers and learn the subject of microbiology as a result. A significant contribution to the students’ improvement is due to their participating sincerely in this “staged” assignment. It has been successful with this particular New York Times article, but I believe this strategy can be adapted to any number of writings with the appropriate complexity in other courses. As an added benefit, this exercise appears to give students a better understanding as to how to do citations and makes the students more tractable when pressed to include citations in their term paper (research) assignments.

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