TEACHING TECHNICAL WRITING THROUGH AN ONLINE HELP DESK SIMULATION

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Instructors have often found that students struggle with assignments in their technical writing courses (Mitchell; Dobrin; Wilson; Mathes), with many noting the difficulty of designing an effective course for technical writing students, when taking into account the fact that the course is skills-centered and effectively without content (Wilson). In particular, some instructors have noted the difficulty of engaging students when drawing solely on the dry, handbook-like readings common in technical writing textbooks. In the past few years, many technical writing instructors have begun to publish pieces that address these struggles, by relating novel and innovative approaches to engaging students in technical writing assignments. Recent scholarship on technical writing instruction has detailed pedagogical approaches using popular novels (Wilson), poetry (Gunn), photography (Hertzberg, Leppek, and Gray), and concept maps (Debopriyo). We seek to add to this growing body of literature on teaching technical writing through innovative measures. In this article, we describe an online simulation of a help desk scenario that we developed to teach principles of technical communication, specifically the technical writing genre of the instruction set.

This article discusses the results of a qualitative evaluation of an iteration of the online, help desk simulation, conducted using Facebook, during an undergraduate technical writing course. Through inductive content analyses of simulation transcripts and written debriefing exercises, as well as data collection during an informal oral debriefing, we find that the role-playing element of the simulation effectively engaged students through their creation of their own fictional identities and backgrounds. Students engaged with the assignment, created thoughtful fictional identities for themselves, wrote insightful reflections about how their practical experiences during the simulation would impact their future writing and revision processes, and provided immensely positive feedback. We find that this process of creating and interacting with these fictional identities forced students to think critically about their technical writing products and spurred thoughtful approaches to revision of their written documents.

Teaching with Simulations

Simulations are classroom activities in which students play roles that demonstrate core features of a real-world system, process, or environment (Greenblat). Instructors frequently use simulations as teaching tools in physical, health, and social science education (Asal and Blake; McCaughey and Traynor; Kee). They are particularly important tools in the social science classroom, where some have argued that they play the same role that laboratory experiments do for the physical science classroom: they provide an opportunity to learn actively from first-hand experience (Asal and Blake). There is, however, very little published work on the use of simulations in the humanities classroom. One scholar has even gone so far as to argue that instructors from humanities-based disciplines would have to completely rethink their teaching objectives in order to integrate them with the capabilities of simulation and gaming for learning (Kee). A search of scholarship on teaching writing revealed even fewer publications on simulations or game-based learning. Those that did appear were at least a decade old, most dating between the late 1990s and the early 2000s, and focused primarily on second-language classrooms. As a body of literature, they find that the creation of a simulated environment for role-based debate or discussion improved students' attitude, focus, and aptitude when writing about the experience, or when writing in relation to the experience later. (See for instance: Cheng; Halleck; Halleck, Moder, and Damron; Moder, Seig, and van Den Elzen.) For instance, in a 2002 article, Salies recounted her use of a simulation to teach English writing at a Brazilian university. In an effort to provide her students with tools to write argumentative essays, she developed a simulation on gun control based on a scenario involving real-world events in Tulsa, Oklahoma, in which a 13-year-old boy home alone shoots and kills a burglar. Students role-played community members using role sheets providing specific backgrounds and interests, and they came together in a town hall meeting to discuss neighborhood crime rates. Students debated and negotiated and then, still in character as their community member roles, wrote letters to local newspapers about the shooting incident and gun control. Salies did not conduct a formal evaluation of the simulation but did debrief her students on the experience and found that students were motivated to participate in the simulation and that students developed a range of language abilities during the simulation. She also found that students responded to the simulation as they might to any element of experiential learning, which she argued was key to writing development (Salies).

Experiential learning, in fact, is a key finding in most pedagogical scholarship on the effectiveness of simulations. In particular, instructors evaluating their simulation teaching tools have found that students learn from simulations through their engagement and identification with the scenario and characters. Williams and Williams argue that simulations result in a series of identifications. First, they assert, simulations can result in affective identification, in which a student becomes personally and emotionally invested in the game and its results. They also note that simulations can result in cognitive identification, when players intellectually identify the game with reality. Finally, they note that simulations can result in behavioral identification, when students begin to identify the insights of the game as choices and lessons they have personally lived and have personally accepted (Williams and Williams).

Some scholarship has found that such role identification behaviors are the building blocks for student learning during a simulation (Pearsall, Ellis, and Bell). And other scholarship has suggested that simulation and gaming environments are especially effective precisely because they allow students to experience new worlds and practice new behaviors in them, thereby developing problem-solving resources and adaptation skills (Gee). Scholars have also found that simulations are most effective when they are carefully constructed to allow multiple opportunities for student identification with their roles. Scholars have argued that an effective simulation must take place in three parts: *preparation*, in which students are introduced to the topic, conduct research on the topic, and read simulation materials; *game play*, in which students undertake the assignment itself; and *debriefing*, in which students engage in guided reflection time after the *game play* stage is over. During the *preparation* stage, students study the subject matter. During the *game play* stage, students have the opportunity to put their learning from the preparation phase into action. Then, during the *debriefing* stage, students internalize the lessons of the simulation (Asal and Blake). Students thus have the opportunity to learn about and shape their characters in their heads, then play their characters, then come back together and think about what they learned from placing themselves into the roles of their characters.

The Simulation

We designed our help desk simulation to capitalize on these opportunities: to provide students with an opportunity to participate in experiential learning related to their writing and to ask them to play roles that would help them work through ideas about how best to write instructions for completing real-world tasks. We designed the simulation to address four primary learning outcomes.

Students will be able to:

- write and revise instruction sets;
- troubleshoot technical instructions;
- communicate, quickly and in written form, with a written document's users/stakeholders; and

- revise their own work and improve the clarity of their instructional command-writing.

Students first discussed writing instruction sets in class. They received the following instructions in an assignment sheet:

> Instruction sets are common technical documents for many disciplines and occupations. Employees read instructions to learn how to assemble a product or complete a procedure. Supervisors write out company policies that often serve as instruction sets. Customers read instructions for using a product. For this assignment, you will develop a set of instructions advising users to perform a specific task.
>
> …Your instruction set must include the following components:
>
> - Introduction or background information, such as:
>   - A technical description of the process that the readers will be completing;
>   - Relevant technical definitions;
>   - Cautions or warnings that apply to the task;
>   - Approximate length of time required for the task; and
>   - A list of materials needed to complete the task.
> - A list of steps in chronological order, broken into sections with appropriate subheadings (please note that there should be a clear hierarchy of headings and subheadings).
>
> You may also want to consider such components as:
>
> - Diagrams, drawings, photographs, figures, or tables, including necessary captions and labels;

- Troubleshooting tips (i.e., advice on how to rectify problems that might arise when a user is attempting to complete the task); and/or
- Glossary of key terms and definitions.

In addition to the information about the technical aspects and organization of formal instruction sets (see Figure 1), we discussed goals for instruction sets, as laid out in the course textbook, *Technical Communication in the Twenty-First Century* (Dobrin, Weisser, and Keller). Discussion focused on the following goals of a technical instruction set:

- To provide the audience with information in an efficient and simple manner;
- To teach the audience to complete a task;
- To teach the audience to solve a problem; and
- To teach the audience to troubleshoot and generate solutions to problems on their own.

We then discussed appropriate questions to help students develop their instruction sets:

- What is the problem I aim to solve with this instruction set?
- What information sources do I need for my instruction set?
- How should I format my document?
- How can I test the document's usability?
- Who is my audience?
- What is my audience's level of expertise? How much and what kind of technical jargon is appropriate?
- What level of skill will my audience need to complete the task?

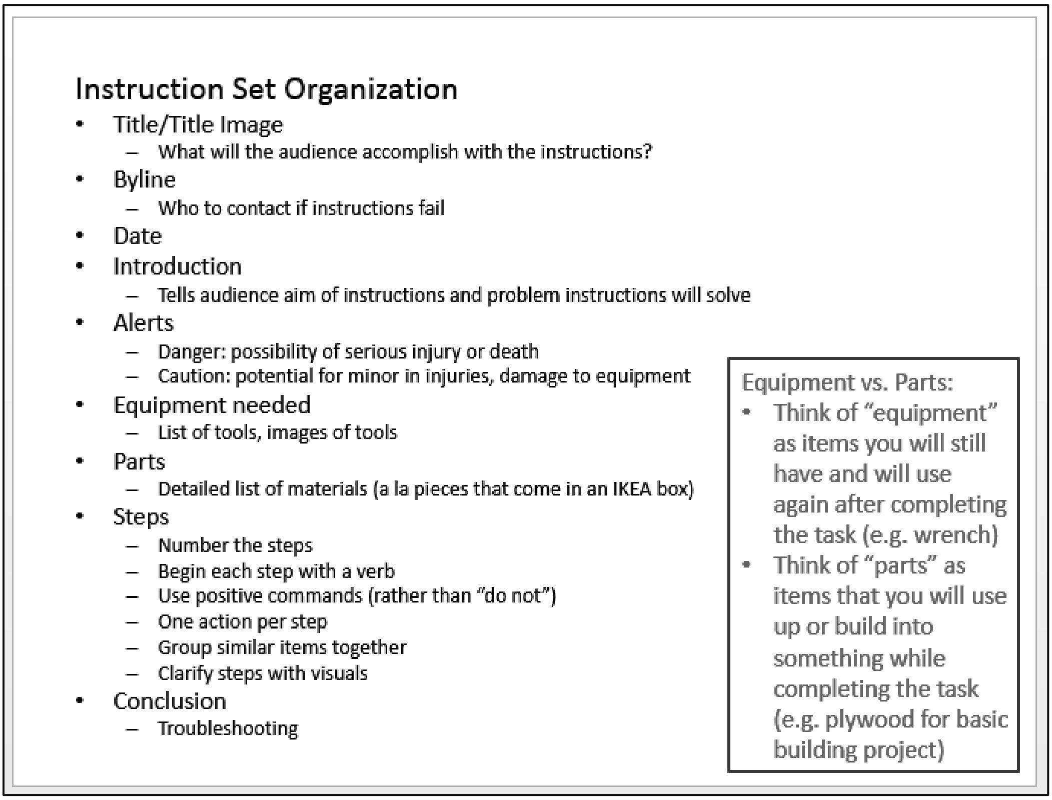

Figure 1: PowerPoint Slide from Class Discussion on Organizing Instruction Sets

The class next moved to the simulation of a help desk environment. We selected a help desk environment as the setting of the simulation in part because help desk support is a key employment avenue for students trained in technical communication (Albers). The setting was also an interesting option because help desk employees are often the arbiters and interpreters of technical communication documents; in fact, corporate research agenda often evaluate the effectiveness of a technical document based on quantity of calls to a help desk (Spilka). Prior to the simulation, students received the following instructions:

On [date], we will hold an online class, in which you will spend 20 minutes in a simulated “help desk” situation, answering questions from two of your classmates online about your instruction set. Many technical writers take positions working at help desks or work closely with help desk teams to write technical documents like instruction sets—in fact, a primary duty of a technical writer can be to reduce calls from confused users to the help desk. Further articulating the process represented within your instruction set will also help you think about how you might revise the document to improve clarity and style.

Homework Assignment. You will be placed into a group of three. On Monday, [date], you will send your instruction set to the other two members of your group, and you will receive their instruction sets. Before class begins on Wednesday, [date], you will develop five questions on each instruction set at places where you might or where you predict another user might arrive at a problem—a place where the user cannot proceed to the next task on the list without technical assistance. You will generate ten questions total, five for each of your group mates’ instruction sets.

Class Time–Simulation. You will participate in this simulation virtually, from anywhere, via Facebook… At the beginning of class on [date], you will log into Facebook and open a secret group I will have created, called “Help Desk Simulation–Group X,” where X is your designated group number.

You will role-play a help desk support person and two help desk callers over the course of the next 60 minutes. We will work in three 20-minute segments, in which you will play the help desk support person for one 20-minute section and help desk callers for your group mates in the other two sections. If you have been designated as receiving inquiries in the first segment of the simulation, you will enter the group and wait for questions to appear in your newsfeed. You may need to periodically refresh your screen, but you should receive notifications in the upper-right corner whenever someone has made a new post. As a help desk support person, you will respond to each question as quickly and accurately as possible. At the end of 20 minutes, you will transition to the role of help desk caller.

As a help desk caller, you will log in to the same Facebook group and post one question at a time, waiting for answers to each question before posting either a follow-up question or a new question. As a caller, you should ask spontaneously developed, follow-up questions at any point in which the support person's answers do not meet your needs or expectations. You may also post feedback—positive or negative—to your support person. It is your job to challenge the help desk support person to write clear, direct, and concise responses to your questions.

Class Time–[Written Debriefing]. During the final 15 minutes of class time, you will write free responses to three reflective questions and send them to me via email:

- What did you learn about writing instruction sets during this exercise?
- What did you learn about your specific instruction set during this exercise?
- What did you learn about the communication skills required for help desk support in this exercise?

Each free response should be two to three paragraphs.

Evaluation Methods

In order to evaluate the success of the simulation, we asked whether students who engaged in the assignment developed their technical writing awareness and capabilities:

> **Reflective Question 1:** Did students refine their instructional command-writing capabilities?
> **Reflective Question 2:** Did students report insights into their own instruction sets and thoughts on revisions?

We tested the help desk simulation assignment in an upper-level, undergraduate, honors class on technical writing at the University of Maryland. The class consisted of 20 students, broken down as follows:

- 11 men, 9 women;
- 3 juniors, 17 seniors;
- 7 students with GPAs between 3.0 and 3.49, 13 with GPAs over 3.5; and
- 2 students from the College of Agriculture and Natural Resources; 1 from the College of Behavioral and Social Sciences; 7 from the College of Chemical, Mathematical, and Natural Sciences; 9 from the School of Engineering; and 1 from the School of Public Health.

We chose to use a written reflection process to allow for textual content analysis after the fact (see below for further discussion of content analysis methodologies). We developed the reflection questions above to allow students to consider how their practical experiences in the simulation—different types of acts, emotions, relationships, strategies, and feelings they may have experienced, the importance of reflecting upon which is discussed further in Petranek, Corey, and Black (1992)—would impact their writing and revision choices. Students received instructions to engage in the written debriefing exercise via Facebook and submitted responses via Facebook Messenger.

We then drew on qualitative content analysis to analyze the simulation itself and the written debriefing exercises. Content analysis is a flexible method for analyzing data from texts (Cavanagh). It has a long history of use in communication, journalism, sociology, psychology, and business (Neundorf), and it can include a range of analytical techniques, including impressionistic, intuitive, and interpretive analyses, as well as systematic, quantitative analyses of texts (Rosengren). Scholars use the method to become immersed in their textual data, and the method aims to characterize a text according to a series of concepts or categories describing it. Elo and Kyngäs describe two approaches to qualitative content analysis—the inductive and deductive methods. The inductive approach to content analysis requires the scholar to code the data according to keywords found in the text, develop coding sheets, group the data, categorize the groupings, and then abstract the categories for interpretation. The deductive approach requires the scholar to begin with the development of an analysis matrix, then to gather data according to that content, then to group the data, categorize the groupings, and abstract the categories for interpretation (Elo and Kyngäs). Hsieh and Shannon describe qualitative content analysis in a similar manner, but they offer three approaches rather than two. In conventional content analysis, the study begins with observation; the scholar defines codes directly from the data during his/her analysis of it. Directed content analysis starts with theory; the scholar defines codes from theory or relevant research findings. In turn, summative content analysis begins with keywords—the scholar develops a list of keywords for the coding protocol based on his/her research interests (Hsieh and Shannon).

We began by coding the transcripts of the simulation itself. We conducted an inductive, conventional content analysis (Elo and Kyngäs; Hsieh and Shannon) of the transcript data, allowing coding themes to emerge as we analyzed the simulation transcripts, focusing on building a typology of the questions that drove interaction within the simulation. We then conducted an inductive, conventional content analysis of students' free responses to the post-simulation written debriefing questions. Again, we allowed coding themes to emerge as we analyzed the free response transcripts (Elo and Kyngäs; Hsieh and Shannon). Finally, we conducted a spontaneous, oral debriefing in the class meeting immediately following the simulation and collected data on student contributions.

Findings

Simulation Results

Once students had indicated topics for their instruction sets, we organized them into groups of three students each, based on subject matter. Seven groups participated in the simulation:

- Group 1–Animals (individual subjects: turtle mark-and-recapture studies; veterinary technician skills; cannula implantation in rats);
- Group 2–Psychology and Wellbeing (parenting; meditation; sleep health);
- Group 3–Health Care (cardiopulmonary resuscitation; first aid; asthma treatment and prevention);
- Group 4–Computer Technology (using Excel; building motherboards; 3D printing);
- Group 5–Studying, Teaching, and Learning (sight-reading for piano, drawing molecular diagrams; studying for an exam in Anatomy and Physiology);
- Group 6–Sports and Games (baseball, poker); and
- Group 7–Miscellaneous (solar panels; MDMA [the drug commonly known as ecstasy] use; theatre rigging technology).

Students submitted their draft versions of their instruction sets electronically to us and to the members of their help desk simulation groups (see Figures 2 and 3). Students then had two nights to draft questions for one another to pose during the help desk simulation.

This instruction set will provide fly system operators with the knowledge to safely move and adjust weight on a typical single-purchase fly system. It will not provide knowledge for more advanced rigging knowledge, including using multiple line sets to fly a single load, or flying human actors.

COMPONENTS

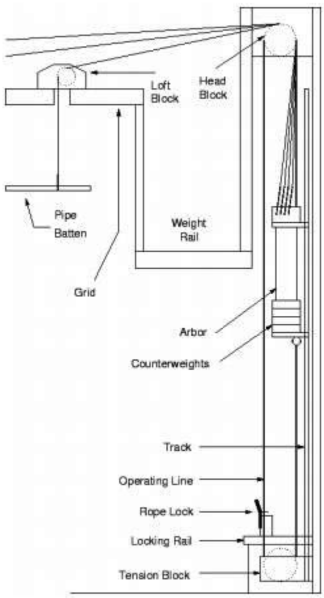

Figure 2: Excerpt of an Instruction Set Draft on Theater Rigging Systems

Each student played the role of the help desk support person for 20 minutes each, fielding questions from two other students simultaneously (see Figure 4). Students received and responded to questions using the Newsfeed function of a locked, “Secret” Facebook group. During his or her 20 minutes as help desk support person, each student fielded between three and eight questions from each questioner, receiving and responding to between six and fifteen questions in total. The entire simulation resulted in a bank of 210 questions.

Instructions

Pre-pitch:

1. Get into the crouching position, with feet shoulder width apart and knees spread away from your body.
2. Call the pitch that the pitcher will throw. *(Tip 1: Skip this step if your team does not require the catcher to call the pitch)*
3. Place your throwing hand behind your back and open glove in front of you, indicating where you want the pitcher to throw the ball.
4. Watch the pitcher as he winds up, while remaining aware of the base runner. (*Tip 2: The base runner should always be in the periphery of your vision and you should be listening to hear if the first baseman gives you any indication that the base runner steals.)*

During the pitch (assuming the runner steals):

5. Move the foot that is on the same side as your throwing arm (right handed thrower will move his right foot) behind you 45 degrees towards your spine. *(Tip 3: Your body should be partially turned towards either first base or third base, depending on whether you are right-handed or left-handed respectively)*
6. Elevate in your crouch. You should elevate to half-way out of your crouch as soon as you complete step 5.
7. Catch the ball. *(Tip 4: This step should not be overlooked, as dropping the ball will make it extremely difficult to catch the stealing base runner)*

Figure 3: Excerpt of an Instruction Set Draft on Baseball (Throwing out a Runner Attempting to Steal Second Base)

[redacted]
You stress that this test should be done with a normal sleeping schedule. Could wearing the device cause a change in sleep cycles? or could knowing that I am testing my sleep cycles cause me to inadvertently change them? If doctors have studied this phenomenon, is there a way around it?

Like · Follow Post · October 14 at 4:17pm

Seen by everyone

[redacted] Off of this question, do irregular sleep schedules like the Uberman sleep schedule impact results?http://en.wikipedia.org/wiki/Polyphasic_sleep

Polyphasic sleep - Wikipedia, the free encyclopedia

Figure 4: Questions Posed by Two Role-Players in the Psychology and Well-Being Help Desk Simulation Facebook Group

After a careful review of simulation transcripts, we identified ten distinct categories of questions that students generated when playing the role of help desk caller. We labeled these question categories as follows:

1. I need something clarified/defined. (DE)
    a. Example (re: asthma treatment): *What is a spacer and what are its implications for an asthmatic?*
2. I made an error. (ER)
    a. Example (re: MDMA testing): *If the reader puts more than 1-2 drops on the substance being tested, is the test void?*
3. I am afraid to take the next step. (FE)
    a. Example (re: turtle mark-and-recapture studies): *I am having trouble measuring the depths of my notch. Will the turtle give me any indication if I am starting to hurt it?*
4. I am unsure of how to measure results. (ME)
    a. Example (re: sleep health): *Is there a meter that can gauge this? Or do I have to estimate it?*
5. The results are not as I expected. (RE)
    a. Example (re: cannula implantation in rats): *I thought I drilled the hole straight, but the screw isn't stabilizing.*
6. I am requesting additional information. (RFI)
    a. Example (re: building a computer motherboard): *This looks really expensive. Is there any way to get parts for cheaper? Can I trust eBay for parts?*
7. I am looking for additional resources on the topic. (RS)
    a. Example (re: sight-reading for pianists): *You noted that pianists should purchase a sight-reading method book to improve sight-reading capabilities. What can such a book provide that your instruction set cannot?*
8. I am unsure of the sequence of steps in the procedure. (SE)
    a. Example (re: CPR): *At what stage of choking would it be appropriate to call for medical assistance? If the victim is coughing should I call? Or should I wait until they stop breathing?*

9. I encountered an unexpected complication. (UC)
    a. Example (re: turtle mark-and-recapture studies): *A snapping turtle seems to have its foot caught in the net. What method would you recommend to get it out without hurting the turtle, or the researcher?*
10. I am unable to perform a step correctly. (UN)
    a. Example (re: MDMA testing): *My company wants me to test bottles of unknown pills we found in the closet for MDMA, but they are requiring me to buy the reagents through our official company chemical supplier. What volume of the reagents should I buy? I cannot find the volume of the reagents you recommend.*

As illustrated in Figure 5, the largest number of questions, at 36%, fell into the category of requests for more information—information above and beyond the scope of the instruction set, but for which the instruction set had piqued questioner interest. Students also asked large numbers of definitional questions or requested points of clarification regarding terminology in the instruction sets (19%). In addition, students engaged in significant creative work, asking a number of questions in which they had (fictionally) reached an unexpected complication in their efforts to complete the instructions, or in which they had (fictionally) made an error that they were unable to correct on their own, or in which they were simply afraid to take the next (fictional) step in the instructions without confirmation and/or support from the help desk (see Figure 6). (Please note that while some students may have followed their instructions in reality, most were forced to place themselves in hypothetical situations, such as the students reading the instruction set on trapping turtles. These students created hypothetical scenarios in which they had run into unexpected complications, which they fictionalized themselves, while attempting to complete the instructions.)

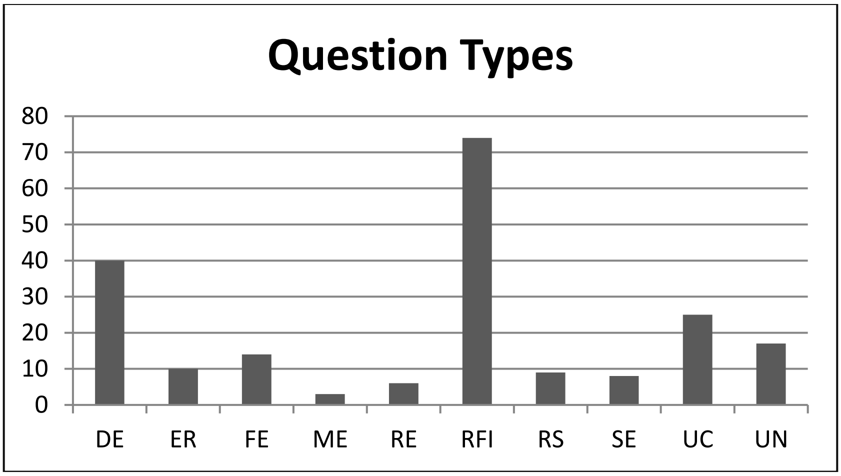

Figure 5: Number of Question Types Coded in Content Analysis of Simulation Transcripts

Questions ranged from 20 to almost 400 characters. Examples of longer questions include:

- (Re: veterinary technical skills): *While attempting a jugular blood draw, the dog jerked suddenly and unexpectedly, which resulted in quite a bit of bleeding. We were not able to get the blood sample, but are concerned with the volume of blood being lost. What should we do?*
- (Re: turtle mark-and-recapture studies): *We found a perfect spot to set up the first trap; it has good depth, few plants, and is not too muddy. There is, however, a bit of a current. Is it okay to set up a trap in moving water, or does it have to be stagnant?*
- (Re: sleep health): *You stress that this test should be done with a normal sleeping schedule. Could wearing the device cause a change in sleep cycles? [Or] could knowing that I am testing my sleep cycles cause me to inadvertently change them? If doctors have studied this phenomenon, is there a way around it?*

Examples of some of the shorter questions include:

- (Re: CPR): *What do I do if I don't have a CPR mask?*
- (Re: 3-D printing): *What program do I use to open my design file?*
- (Re: building a computer motherboard): *What are SATA cables, and what does the acronym stand for?*
- (Re: theater rigging): *How do I know when to move the baton up or down?*

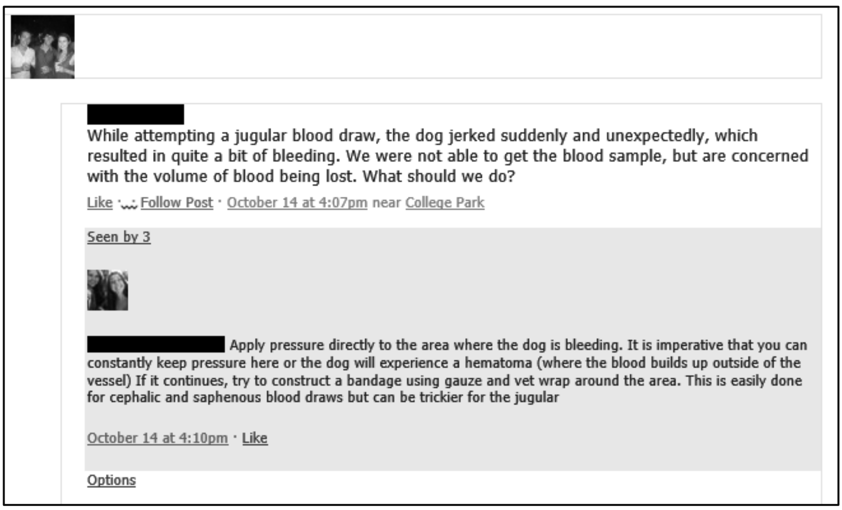

Figure 6: Interaction between Two Role-Players in the Animals Help Desk Simulation Facebook Group

Students answered every question asked, with responses ranging from seven to nearly 700 characters. Some of the longer responses include the following examples:

- (Re: cannula implant surgery in rats): *With the forceps, apply gentle pressure to the areas around the suture and around the base of the screw. If the bone is structurally sound, it will not give way and you can proceed with the surgery. However, if the bone does give way, the surgery cannot be completed and it is suggested that the animal be euthanized. Keeping the animal* *alive would induce a great deal of pain, and it is best that the animal not suffer.*

- (Re: CPR): *[If] you are an untrained bystander and you are alone, the AHA recommends you first call emergency medical response and second, perform hands-only CPR. If you are not alone, a second bystander may locate and use the AED as the newer models are designed to be easy to use for an untrained bystander. If for any reason you are uncomfortable using an AED, hands-only CPR has been proven to be very effective in supporting circulation until emergency medical personnel arrive.*
- (Re: asthma treatment): *A nebulizer is a device that administers medicine to the user through a process called a nebulizer treatment, also known as a breathing treatment, aerosol treatment, or med neb. A plastic tube connects the three main parts of the nebulizer: machine, medicine container, and mouthpiece/mask. When used, the compressed air travels through the tubing to the medicine container and converts the liquid medicine to aerosolized mist, which is carried to the mouthpiece/mask through the tubing. This medicine penetrates the airways and relieves breathing problems more quickly than metered dose inhalers.*

Shorter answers include some of the following examples:

- (Re: using Excel): *Paste the new code 1 line after your other code but before "End Sub."*
- (Re: MDMA testing): *Each reagent should be able to conduct 50 + tests.*

After an hour of role-playing one help desk support person and two help desk callers, the students concluded the simulation. We held two debriefing exercises: a reflective writing assignment and an oral debriefing of student experiences.

Written Debriefing

In the written debriefing exercise, students responded to questions about what they had learned about writing instruction sets, about their own specific instruction sets, and about the communication skills required for supplying help desk support (see Figure 7). Upon review of the transcripts of these reflections, we identified a series of themes emerging from student responses. Students reported learning lessons relating to the following instruction-writing capabilities: audience accommodation; author credibility and intellectual preparation; scenario-based instruction and troubleshooting; and visual aids and data visualization.

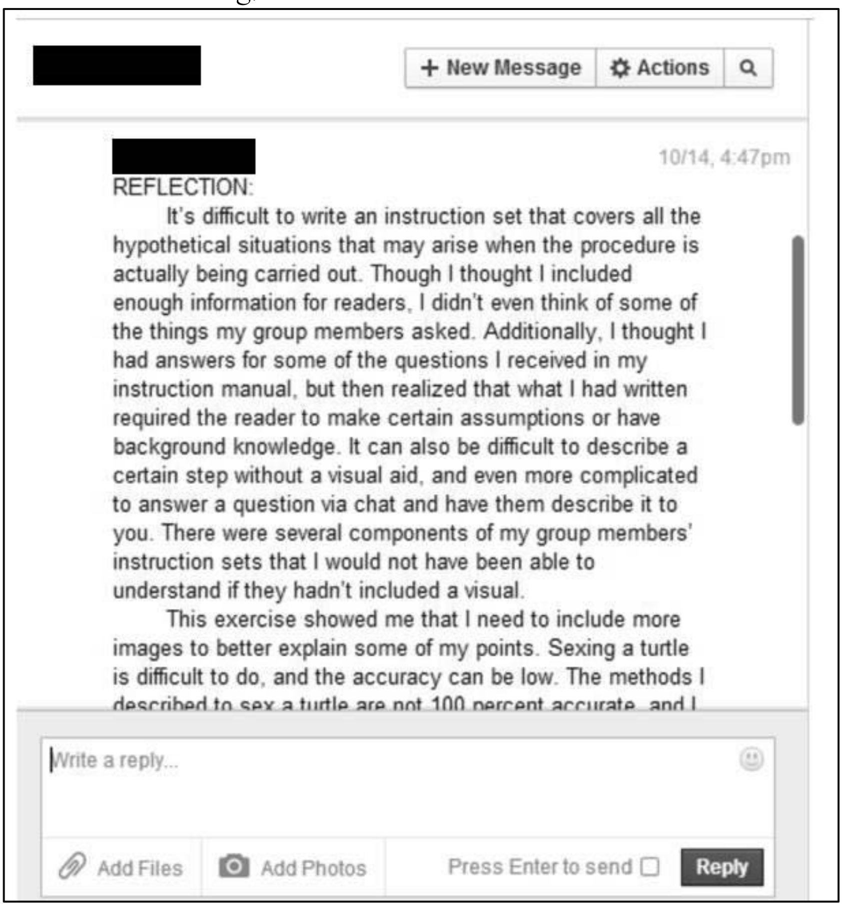

Figure 7: Submission of a Written Debriefing Response via Facebook Messenger

Audience Accommodation

Nearly all students—80% of those participating—noted in their reflections that the simulation had demonstrated to them the importance of working to first analyze and then actively accommodate their specific audiences' needs when writing instructional literature. On this topic, many students commented on the need to write instructions for the least-experienced user or the lowest common denominator of user. One student noted, "Every step needs to be written assuming the person will have no familiarity with the process…" Another student noted that the inability to predict each user's background meant that a writer must carefully define all technical terms in a document and use those terms carefully and precisely. Other students focused on the importance of being able to break complex concepts into simple, easy-to-follow explanations. And while most students noted this idea that an instruction set should target a lowest common denominator of user, students also keyed in to the idea that even those users will experience and utilize a document in ways different from one another. Several students noted that they had prepared for questions in areas where they expected novice users to experience problems but found questions ranging across a wider swath of topics than they were expecting. One student astutely summed up the issue: "[I] realized that even when [my instructions are] tailored [for] a basic audience, people reading [them] are likely to have a very varied range of experiences and problems."

Along similar lines, several students noted that the simulation forced them to accommodate multiple audiences through both the initial written instructions and the task of helping more than one user in real-time. One student noted the difficulty of jumping between questions and between different levels of user experience and understanding. Others noted that this element of forced multiple audience accommodation was good training for them in not just instruction-writing, but in communication generally. One student noted, "I learned that help desk support requires a quick, agile form of communication that adapts itself to the requests of the person needing help." Another student noted that the quick-thinking he had to utilize in the simulation will help when interacting with his engineering colleagues on technical projects in the future. Another student noted that the simulation had shown her that it is important to be able to communicate an explanation in multiple ways depending on her audience: “I learned that I need to have multiple ways of voicing the same idea because that same idea may ‘click’ for different people in different ways.” One student summed up the idea concisely: “I now realize that I have to put myself in the audience’s shoes to effectively communicate with them.”

Author Credibility and Intellectual Preparation

Three-quarters of students noted the substantial degree of intellectual preparation required to effectively write and troubleshoot instructions and to establish credibility and/or authority as the technical writer behind a set of instructions. Students were concerned with appearing as experts to their users and with providing responses that appeared to be thorough and complete. One student indicated, “It is absolutely critical that the help desk supporter is able to deliver a helpful, accurate, and clear response to the recipient so that the recipient is able to absorb the new knowledge the first time it is mentioned. Otherwise, readers will be confused and question the credibility of the writer.” Students also indicated the difficulty in researching and understanding the process they were writing about so completely that they would be able to anticipate, understand, and respond to all callers’ questions—numerous students commented on the need to develop clear expertise in the subject on which they would be answering questions, and some noted the importance of trying to anticipate frequently asked questions. One student stated, “I realized that I probably should have prepared more and brainstormed possible questions.” Another student noted surprise at the wide variety of topics that drew questions during the simulation—not just the ones for which he had prepared.

Scenario-Based Instruction and Troubleshooting

Nearly half of participants discussed the importance of incorporating scenario-based instructions and/or troubleshooting real-world scenarios to write effective instructions. One student noted that many of the questions s/he received "were not about specific procedures but more about 'what if' situations." Another student noted that the interactive and role-playing nature of the simulation had been particularly helpful for him/her in considering hypothetical scenarios in which a user might need to improvise or deviate from the instructions as written. One student, writing instructions on parenting techniques, wrote, "…since these instructions depend heavily on how the child reacts… it is important that I devote [space to a] troubleshooting section." On this point, students also reflected on the importance of providing justification for instructional commands, or scenario-based background or context to help users understand why they need to follow the commands. One student wrote, "I learned that I need to explain myself better in the introduction as to why this instruction set is important." Another noted the need to give "each step a context [to help] clarify [that the] step was present and necessary." And another noted, "I should add [an] overview of the task, so the reader knows in the beginning exactly where the text is going." One student was even so explicit as to say, "I learned that anytime something is stated or defined in an instruction set, the author should elaborate on WHY the statement is true" (emphasis: the authors').

Visual Aids and Data Visualization

Just over half of the participating students noted that the simulation had convinced them of the importance of offering visual aids and/or data visualizations in their instructions. Perhaps more importantly, many students noted that they learned lessons about how to effectively incorporate images into their documents. Several students noted that their customers struggled to interpret images when the writer had not offered a text-based explanation of the image. Other students noticed the importance of carefully and concisely labeling images. Overall, students expressed thoughtful support for the importance of incorporating visual media in technical documents but also expressed frustration at the difficulty of doing so effectively: "Images and diagrams would be helpful, but it is difficult to find images that would assist the user."

Oral Debriefing

In the first in-person class session following the simulation, we held an informal oral debriefing of the simulation. Because we had held a highly structured written debriefing exercise, we chose not to structure the oral debriefing; instead, we allowed students to raise whatever points they wished, so that we might determine the elements of the simulation that had been most interesting to them, without a prompt from us.

The students were enthusiastic about the activity; a number of students indicated that they felt the experience had helped them to refine and improve their instruction sets significantly. Several students noted that the simulation had helped them more than the traditional peer-review workshops we had used for other class assignments. Students generally displayed a high level of excitement about how the simulation had proceeded and what they had learned, and many called the simulation "fun."

Students noted that they felt they had faithfully adopted their roles as customers, and that doing so had helped them understand the context in which a real customer might feel compelled to seek expert technical assistance. Several students spoke at length about their processes for generating the fictional situations they used to shape their questions. One student noted that she had developed her question set for the exercise by "pretending that [she] was a little kid asking, 'but, what if?'" Many of the participants indicated they had felt challenged by and had enjoyed the work of creating fictional roles for themselves in order to challenge their classmates and their classmates' documents based on a variety of situations.

Several students noted that this vigor with which their classmates assumed fictional roles challenged them to think substantively about audience accommodation in their writing. A few students noted that the experience of talking to a fictional customer made them aware of the importance of justifying the advice they were giving to their customers, providing details supporting the reasoning behind their commands both to satisfy customer curiosity and to reassure customers nervous to complete a step in the instructions. Students noted that this experience reinforced for them the disparity between their own knowledge of the subject matter in their documents and their readers' knowledge of the subject matter. Several students noted that the experience helped them realize how careful a writer must be when making assumptions about an audience's background and motivation for reading for a document.

Students concluded that the role-playing aspect of the simulation had helped them to think more critically about their documents than other editing and peer review processes. Students noted in particular that the process of responding to simulated customer demands and their fictionalized scenarios forced them to think about attending to hypothetical scenarios in their documents. Many students noted that they would add Frequently Asked Question sections to their documents and Troubleshooting sections in which they addressed potential real-world implementation problems.

The informal oral debriefing thus yielded many of the same themes as the structured written debriefing, but it also specifically highlighted student response to the creative process of developing their fictional identities and responding to the fictional identities of others. Students indicated that this creative process forced them to think critically about how they were interacting with potential users of their documents and to critically assess how they could revise and improve their written documents.

Discussion

This pedagogical experiment was particularly notable within the context of existing literature on teaching with role-playing simulations. Specifically, the students' participation in the simulation and their reflection on the experience indicated that they were able to effectively create robust fictional roles for themselves—a turtle researcher, a computer engineer, a parent with a special-needs child—and to remove themselves from their own personal identities sufficiently enough to identify with these roles they had created. Using these fictional roles, students asked one another difficult questions with multiple follow-up queries.

In comparison to traditional peer review exercises we conducted on other class assignments, one student noted about the simulation, "It was a much better way to peer-review my document." Other students agreed with the statement. Their feedback seemed to suggest that the simulation had been a more active learning experience—requiring dialogue between peer-reviewer (customer) and author (help desk expert), as well as critical thinking about the needs of the document's users. In particular, this element of active learning and of engaging with an audience member appeared to be a key issue for students, who first and foremost, wrote about the lessons they had learned related to audience accommodation during the simulation. The simulation also appeared to place a time pressure element on students—they had 20 minutes total to answer 10 questions, and the questions came in concurrently from two "customers"—which required students to think quickly and spontaneously, perhaps helping to foster their identification with the fictional roles they were playing. The results of our content analysis also suggest that this classroom exercise was particularly effective in developing the kind of multi-layered identification with roles discussed by Williams and Williams (2010), beginning with the affective identification students established when they created their fictional characters and their needs, extending through the cognitive identification that students established when they immersed themselves into the fictional worlds they had created, through behavioral identification, which students established when they internalized the technical communication lessons they learned while playing their roles. In sum: students engaged with the assignment, preparing thoughtful questions for one another; students created fictional identities for themselves and remained in character when questioning one another; students wrote thoughtful written debriefing reflections about how their practical experiences during the simulation would impact their future writing and revision processes; students indicated enthusiasm for revising their instruction sets based on their experiences during the simulation; and students were eager to reflect orally on the experience, providing immensely positive feedback. These revelations support the idea that this role-playing-based interaction gave students new ideas about their technical writing products and that experiential learning focused on role-playing can play an important role in the writing classroom.

Works Cited

Albers, Michael J. *Human-Information Interaction and Technical Communication*. Hershey, PA: Information Science Reference, 2012.

Asal, Victor, and Elizabeth L. Blake. "Creating Simulations for Political Science Education." *Journal of Political Science Education* 2.1 (2006): 1-18.

Cavanagh, Stephen. "Content Analysis: Concepts, Methods, and Applications." *Nurse Researcher* 4.3 (1997): 5-16.

Cheng, An. "Simulation-based L2 Writing Instruction: Enhancement Through Genre Analysis." *Simulation and Gaming* 38 (2007): 67.

Debopriyo, Roy. "Concept Maps for Teaching Technical Writing to Computer Science Majors: A Case Study in a Japanese Technical Institute." *International Journal of Learning* 17.1 (2010): 421.

Dobrin, David. N. "What's Difficult about Teaching Technical Writing." *College English* 44.2 (1982): 135-40.

Dobrin, Sidney I., Christian R. Weisser, and Christopher J. Keller. *Technical Communication in the Twenty-First Century*. 2nd. London: Longman Publishing, 2009.

Elo, Satu, and S. Helvi Kyngäs. "The Qualitative Content Analysis Process." *Journal of Advanced Nursing* 62.1 (2008): 107-15.

Gee, James P. *What Games Have to Teach Us About Learning and Literacy*. New York: Palgrave Macmillan, 2003.

Greenblat, Cathy. S. *Designing Games and Simulations*. Newbury Park: Sage, 1988.

Gunn, Craig. J. "Revisiting a Liberal Activity in a College of Engineering: Engineers as Poets, 10 years later." *ASEE Annual Conference Proceedings*. San Antonio, Texas, 2012. <http://www.asee.org/public/conferences/8/papers/3961/view>.

Halleck, Gene B. "Simulation in an ESL Class." *Simulation and Gaming* 21 (1990): 82-86.

Halleck, Gene. B., Carol L. Moder, and Rebecca Damron. "Integrating a Conference Simulation into an ESL Class." *Simulation and Gaming* 33.3 (2002): 330-44.

Hertzberg, Jean, Bailey R. Leppek, and Kara E. Gray. "Art for the Sake of Improving Attitudes Toward Engineering." *ASEE Annual Conference Proceedings*. San Antonio, Texas, 2012. <http://www.asee.org/public/conferences/8/papers/5064/view>.

Hsieh, Hsiu-Fang, and Sarah E. Shannon. "Three Approaches to Qualitative Content Analysis." *Qualitative Health Research* 15 (2005): 1277-88.

Kee, Kevin. "Computerized History Games: Narrative Options." *Simulation and Gaming* 42.4 (2011): 423-40.

Mathes, J. C. *Assuming Responsibility: An Affective Objective in Teaching Technical Writing.* Ann Arbor, MI: University of Michigan, n.d. <https://archive.org/details/ost-technical-writing-19810013429>.

McCaughey, Caroline S., and Marian. K. Traynor. "The Role of Simulation in Nurse Education." *Nurse Education Today* 30 (2010): 827-32.

Mitchell, Ruth. "Shared Responsibility: Teaching Technical Writing in the University." *College English* 43.6 (1981): 543-55.

Moder, Carol. L., Mary T. Seig, and Brad Van Den Elzen. "CIMARRON VALLEY: A Simulation-based EAP Composition Curriculum." *Simulation and Gaming* 33.3 (2002): 284-98.

Neundorf, Kimberly A. *The Content Analysis Guidebook*. Thousand Oaks: Sage, 2002.

Pearsall, Matthew J., Aleksander P.J. Ellis, and Bradford S. Bell. "Building the Infrastructure: The Effects of Role Identification Behaviors on Team Cognition Development and Performance." *Journal of Applied Psychology* 95 (2010): 192-200.

Petranek, Charles F., Susan Corey, and Rebecca Black. "Three Levels of Learning in Simulations: Participating, Debriefing and Journal Writing." *Simulation and Gaming* 23.2 (1992): 174-85.

Rosengren, Karl E. "Advances in Scandinavian Sontent Analysis: An Introduction." Rosengren, Karl E. *Advances in Content Analysis*. Beverly Hills: Sage, 1981. 9-19.

Salies, Tania. G. "Simulation/Gaming in the EAP Writing Class: Benefits and Drawbacks." *Simulation and Gaming* 33 (2002): 316-29.

Spilka, Rachel. "The Issue of Quality in Professional Documentation: How Can Academia Make More of a Difference?" *Technical Communication Quarterly* 9.2 (2000): 207-20.

Williams, Robert H., and Alexander J. Williams. "One for All and All for One: Using Multiple Identification Theory Simulations to Build Cooperative Attitudes and Behaviors in a Middle Eastern Conflict Scenario." *Simulation and Gaming* 41 (2010): 187-207.

Wilson, Chad A. B. “A Novel Approach to Teaching Technical Writing.” *ASEE Annual Conference Proceedings*. San Antonio, Texas, 2012.