TEACHING STUDENTS HOW TO TAILOR MESSAGES: LESSONS LEARNED FROM A TECHNICAL COMMUNICATION COURSE

Mary Frances Baechle

Submitted to the faculty of the University Graduate School
in partial fulfillment of the requirements
for the degree
Master of Arts
in the Department of English,
Indiana University

December 2016

Accepted by the Graduate Faculty, Indiana University, in partial fulfillment of the requirements for the degree of Master of Arts.

Master's Thesis Committee

_____
Kim Brian Lovejoy, Ph.D., Chair

_____
André Buchenot, Ph.D.

_____
Corinne Renguette, Ph.D.

Dedication

My interest in tailoring messages is directly related to the time when ineffective health communication about the side effects of a Hepatitis C treatment resulted in my mother being rushed to the hospital, close to death. Nearly losing Mom because of confusing patient information prompted me to explore the field of health communication and look for research that studied ways to improve it. My discussions with my mother about her situation helped me think about how communication techniques that are successful in improving health communication might be used in the technical communication field. Thanks, Mom, for helping me find a research topic!

I would like to also thank my husband, Peter Baechle, for his support and encouragement as I worked through this thesis – and in everything I do.

This thesis is dedicated to the loving memory of my father, William Lawrence Blaney, and my brother Robert Lee Blaney, who gave me credit for being smarter than I am.

Acknowledgements

I would like to gratefully acknowledge my thesis committee chair, Dr. Kim Lovejoy, and my thesis committee members, Drs Corinne Renguette and André Buchenot for their thoughtful ideas. Thank you for supporting me in my exploration, challenging me to be a better researcher and writer and helping me find my voice.

Mary Frances Baechle

TEACHING STUDENTS HOW TO TAILOR MESSAGES: LESSONS LEARNED FROM A TECHNICAL COMMUNICATION COURSE

Tailoring messages is the process of customizing messages that are more relevant for the receiver, with the aim of improving the recipient's engagement with and understanding about information in the message. Little research has been done to look at tailored messages in technical communication about healthcare technology, even though the use of technology in healthcare, and the complexity of that technology, continues to increase. Research was performed to investigate if students who plan to work in the healthcare technology field can demonstrate an understanding about tailoring messages and can tailor messages in their technical communication. A four-phase Action Research Cycle for inquiry into teaching and learning was used to modify course materials and analyze work for six assignments submitted by 14 students enrolled in Technical Communication for the Health Care Professions, TCM 38000, during the 2015 spring semester. Although TCM 38000 has always been open to students in other majors, the majority of students who take the course are in the Health Engineering Technology Management (HETM) program at Purdue's School of Engineering and Technology on the campus of Indiana University Purdue University Indianapolis (IUPUI) in Indianapolis.

Overall, the modifications made to TCM 38000 were successful in helping students begin to learn about tailoring messages and create messages tailored for a

specific end-user in their technical communication developed for some course assignments. In their Reflections for a User Manual assignment, the majority of students explained that they used what they learned through course materials and discussions to reach beyond their learning and come up with techniques for tailoring messages on their own. Students used word choice, information content and role-play techniques to determine the end-user's information needs and then to tailor messages in their manuals to address those needs.

After reflecting on the results of the research, some course materials will be modified so that students can gain a deeper understanding about tailoring messages and can have more opportunities to practice writing tailored messages in course assignments. Research implications expand beyond the classroom into workplace training for organizations that have both technical and non-technical employees that must effectively communicate.

Kim Brian Lovejoy, Ph.D., Chair

Table of Contents

List of Tables

List of Figures

Chapter 1: Introduction

Tailoring messages is the process of customizing messages that are more relevant for the receiver, with the aim of improving the recipient's engagement with and understanding about information in the message (Hawkins et al. 454 and Rimer and Kreuter S184). Tailoring messages was first used in marketing to increase consumer engagement with information in product advertisements (Turow 244). In the late 1990s, tailored messages began to appear in health communication as a way to improve patient understanding about health information (Rimer and Kreuter S186-S187).

This thesis will explore if students in a technical communication course can demonstrate learning about the concept of tailoring messages and show evidence of tailored messages in their work. The ability of tailored messages to help communicate information more clearly to the recipient was the impetus for investigating if students could learn how to tailor messages in their technical communication, with the ultimate goal that they use that skill in their workplace communication with non-technical audiences. Although most of the research about tailored messages has been done in the field of health communication and is not directly related to the field of technical communication, it is included to inform the reader's understanding about the concept of tailoring messages.

Teaching Tailoring Messages in a Technical Communication Course

Research indicates that poor communication among healthcare professionals leads to "more adverse…outcomes to patient care" (Åström, Duggan and Bates 279). Most health communication research focuses on ways to improve patient-doctor

communication, but the technical communication about healthcare technology is equally important in impacting outcomes.

Technical Communication for the Health Care Professions, TCM 38000, is an online course that "focuses on the writing demands of the healthcare industry and so includes principles of clear writing, concise style, and organized ideas" students need to know to develop the types of technical communication they will use in their healthcare technology professions ("TCM 38000 description"). TCM 38000 is offered in the Technical Communication (TCM) program, housed in the Purdue School of Engineering and Technology, on the campus of Indiana University Purdue University Indianapolis (IUPUI) in Indianapolis. TCM 38000 was initially designed for students majoring in the School of Engineering's Health Engineering Technology Management (HETM) program, formerly known as Biomedical Engineering Technology (BMET). Although TCM 38000 has always been open to students in other majors, the majority of students who take the course are in the HETM program. Some of the job titles HETM graduates may be known by in the workplace include Healthcare Technology Specialists, Biomedical Electronics Technicians, Biomedical Equipment Technicians, Clinical Engineers and Biomedical Engineers ("What is Healthcare Engineering Technology Management?"). Throughout the remainder of this paper, "Health Medical Technologist (HMT)" will be used to refer to these various job titles and "healthcare providers" will be used to refer to the non-technical medical professionals, including physicians, nurses, medical technicians and medical clinicians, who work with HMTs. In the healthcare environment, HMTs maintain and repair medical equipment, help make medical equipment-purchasing

decisions, and train healthcare providers on how to use medical equipment properly (Arquilla and Cram 100).

This research study will look at student work of 14 undergraduate students that were enrolled in TCM 38000 during the 2015 spring semester. Prior to the start of the 2015 spring semester, TCM 38000 course learning materials were modified to instruct students about the concept of tailoring messages, assess students' knowledge about tailoring messages in precourse and postcourse writing assignments about health information, require students to practice tailored messages in a module assignment and ask students to reflect on their understanding about and application of tailored messages in an end-of-module reflection. Two course textbooks provided course readings about tailoring information. Students got their primary information about the concept from these course readings, including definitions of tailoring messages and descriptions about how tailored messages are used. In addition to textbook readings, students were required to post their analysis of the readings in an online discussion forum and to comment on at least two other classmates' posts. During the first of the two online meetings about tailoring messages, instructor-led class discussions focused on tailored messages and their use in health communication to help communicate information more clearly to an audience of one or a small hyper-targeted group. Hawkins et al. defined a hyper-targeted group as "individuals with similar knowledge, attitude, efficacy, barriers, behavioral pattern, etc. (456)." During the second online meeting, instructor-led class discussions focused on ways to tailor messages to develop instructions about technology for a non-technical audience and using tailored messages to develop a User Manual.

The goal of this thesis is to explore using tailored messages for a single person or hyper-targeted group in technical communication. This thesis aims to determine if students in a technical communication course can understand the concept of tailoring messages and show evidence of that understanding through tailored messages in their work. The remainder of this thesis will support this exploration and examine students' work for evidence of their understanding about the concept of tailoring messages and their ability to tailor messages. A literature review about tailoring messages appears in Chapter 2. Chapter 3 gives a discussion about the methodology that informed this study, the criteria used to evaluate student work and the analysis of student assignments. Chapter 4 provides a discussion about the results of the analysis. Reflections about how to improve the TCM 38000 course and the implications of research findings appear in Chapter 5.

Chapter 2: Literature Review

Tailoring messages is the process of customizing messages so that they are more relevant for the receiver (Rimer and Kreuter S186-S187). Tailored messages have been successfully used to communicate health information more clearly to the patient (Rimer and Kreuter S186-S187). The ability of tailored messages to support effective health communication was the impetus for exploring if students could learn how to tailor messages in their technical communication, with the ultimate goal that they use that skill in their workplace communication with non-technical audiences.

Tailored Messages and Health Communication

Joseph Turow claims that tailoring messages was first used in marketing as a way to "customize media content and ads to the backgrounds and lifestyles of particular individuals... to send individually created messages" to consumers (244). Marketing research indicates that messages tailored to an individual or small hyper-targeted group increases self-identification with the message, improving the likelihood that the recipient will attend to the information in the message (Turow 245). Receiving a birthday card with a coupon from your favorite shoe store is one example of how tailored messages are used in marketing (Turow 244).

The success of tailored messages being used to increase recipients' attention did not go unnoticed by the field of health communication. In late 1990s, as a part of a "growing marketing approach to customize [health] information, " health communicators began tailoring messages to increase patient attention to health information (Rimer and Krueter S186-S187). Early use of tailored messages in health communication relied solely on personalization, using a patient's name or other identifying characteristics, to

increase recipient attention to the information (Rimer and Kreuter S185-186). When later research indicated messages customized by gender, race, ethnicity, age/generation and socioeconomic status made information more relevant to the recipient, health communicators began to tailor messages based on these cultural characteristics (Corcoran 30). Seminal studies by Gerber et al. (2005), Campbell and Quintiliani (2006), Rimer and Kreuter (2006), Volk et al. (2008), Jerant et al. (2010) and Noar et al. (2011), to name a few, strongly indicated that tailored messages improve health communication.

Recent research has expanded tailored messages into digital spaces, using responses in online interventions to develop one-on-one tailored messages in real-time. Health communication research Volk et al. (2008), Jerant et al. (2011), Jensen et al. (2012) and Han et al. (2010), among others, have studied the efficacy of tailored messages developed from interactive applications. However, some in the health communication field have posited that developing information to a single audience through online interventions limits the applicability of tailored messages (Hawkins et al. 456). Instead, these researchers suggested that tailoring messages to a small, hyper-targeted group may be more cost-effective and may move tailored messages out of the research environment and into the everyday world (Hawkins et al. 456). In their meta-analysis, Hawkins et al. suggested that widening the audience to a small hyper-targeted group does not dilute the relevance of the message, nor does it negatively impact the communication (456).

Tailored Messages and Technical Communication

The idea of tailoring messages appears to be a perfect fit for technical communication. The real-world nature of technical communication has always relied on analyzing the audience's general communication and information needs to effectively explain complex information to both technical and non-technical groups. Audience analysis helps communicators determine "the audience's attitudes, beliefs, and expectations" as part of the technical discourse (Ede and Lunsford 156). Technical communicators use audience analysis to envision the information needs of homogenous audiences with similar knowledge about and experience with technology. Nevertheless, Pfister and Petrik suggested that the audience envisioned by the technical writer, whether real or imagined, is based on "those…readers who actually exist in the world of reality," and for that reason alone, audience analysis helps support audience understanding of technical information (qtd. in Ede and Lunsford 156). Because tailored messages are customized to address the information needs of a specific recipient or hyper-targeted group, they go beyond audience analysis to improve the likelihood that the audience will understand the technical communication.

Tailored Messages and Technical Communication in Healthcare Professions

According to Michael Morschauser, effective communication between HMTs and healthcare providers helps ensure the safe and successful operation of medical technology in support of patient care (129). However, very little research was found that studies the technical communication between HMTs and healthcare providers. And, the few articles in professional journals that discussed this topic found that this communication is often not effective, even though both groups "share the same common goal" of patient care

(Douglas 44). In their research about technical communication, Lauren Arquilla and Nicholas Cram refer to the "stupid nurse complex" that HMTs frequently reference (100). Although the authors do not elaborate, the context of the journal article suggested that this pejorative term refers to some HMTs' perceptions of healthcare providers' inability to understand and properly use medical technology (100). While the term is inexcusable, the idea may be supported by the fact that some healthcare providers have extensive experience in patient care, but may not have equally developed technology skills (Cockey 12). Conversely, some HMTs do not understand the work that healthcare providers do and how they use technology (Cockey 13). Interviews with nine healthcare professionals representing administrative, record keeping, nursing and clinical engineering departments also suggested the ineffective communication between HMTs and healthcare providers is partially attributed to both groups being unfamiliar with each other's work and not "shar[ing] the same language" (Cockey 12-15). This lack of understanding about what each group does contributes to ineffective technical communication. Arquilla and Cram suggested the ineffective communication between HMTs and healthcare providers may "create a tense and stressful climate that breeds conflict and lack of support if each department views [decisions about medical technology procurement] as a turf battle" (100). Indeed, in some healthcare settings, HMTs may make purchasing decisions about technology without asking for input from the healthcare providers who will use that technology in patient care (Hayhurst 19). An additional challenge is that HMTs may be lacking in clear technical communication skills and may not be effective at explaining technology to non-technical healthcare providers (Hayhurst 20). Although the scope of

this thesis does not address this issue, it should be explored in future research since it is a skill that technical communication students can bring to their workplaces.

What little research is available clearly shows there is a need to improve the technical communication between HMTs and healthcare providers. Indeed, the need to improve technical communication between technical and non-technical audiences is needed in many fields. Communicators in computer programming, environmental engineering, mechanical engineering, software development, regulatory compliance and pharmaceutical manufacturing fields, to name a few, can benefit from learning about tailoring messaging and incorporating tailored messages to help communicate technical information more clearly to non-technical employees, customers, regulators and decision-makers.

Gap in Research

Little research has been done to look at tailored messages in technical communication about healthcare technology, even though "facilitating the flow of information freely between all [team] members should be central to health communication (Hesse and Davis 52)." Few researchers have looked at ways to improve the technical communication between HMTs and healthcare providers, and yet the use of technology in healthcare – and the complexity of that technology – continues to increase. Research is needed to investigate if students who plan to work in the HMT field can demonstrate both an understanding of the concept and an ability to tailor messages to improve their technical communication skills.

Research Question

Gary Kreps called for research to "carefully identify the critical issues confronting at-risk populations, health care providers, family caregivers, and *others participating in the modern health care system* [italics mine] and then design studies to address these important health problems" (7). There is a need for research that explores how tailored messages may improve technical communication, particularly research that can be applied in the workplace. Exploring the idea of tailoring messages for technical communication aligns with the content in TCM 38000, a technical communication course for healthcare professions. While the concept of tailoring messages has not been explored in technical communication, the idea is not too far from audience analysis, a foundational practice in the real-world nature of technical communication.

One of the goals of TCM 38000 is "to provide students with the skills necessary to effectively communicate in the healthcare industry," as described in the course description ("Technical Communication in Healthcare Professions" para 1). The majority of students who take TCM 38000 are enrolled in the HETM program at the Purdue School of Engineering and Technology. Many of these students are the future HMTs who will need to effectively communicate with non-technical audiences about healthcare technology, so teaching these students about tailoring messages and helping them tailor messages in their technical communication is appropriate. A research study that analyzes student work for TCM 38000 course assignments will be used to answer the following research questions.

- Can engineering and technology students enrolled in a technical communication course understand the concept of tailoring messages? If so, how will that understanding be shown in their course work?
- Can engineering and technology students enrolled in a technical communication course tailor messages in the technical communication they create for course assignments?

The methodology used to inform the research and analyze research data is described in Chapter 3.

Chapter 3: Research Methodology

In his evaluation of tailored messaging in health communication, Gary Kreps challenged researchers to design practical studies about the critical issues that challenge those in the healthcare field (Kreps 7). The aim of this thesis study – to determine if engineering and technology students can understand the concept of tailoring messages and tailor messages in their technical communication – is one small effort to respond to that challenge. In keeping with Gary Kreps' wish to design practical studies, Action Research methodology was used to inform this research.

Action Research Methodology

Action Research is a small-scale interpretive research practice that aims to put the research into action (Mills and Butroyd 5-7). Paul McIntosh explains that Action Research has roots in the research of Kurt Lewin, who studied the way systems work together in their natural systems (32). Teachers often use Action Research to evaluate their teaching practices and student learning because it allows them to take on both roles of teacher and researcher at the same time (Mills and Butroyd 7). Similarly, McIntosh describes the teacher-researcher dual role, the ability to conduct Action Research on a small-scale and the use of reflection in inquiry as some of the reasons why Action Research is well suited to teachers who want to evaluate learning experiences in their courses (35-36). Reflection as a part of the inquiry process helps teacher-researchers gain new knowledge about their teaching practices and helps them use that knowledge to improve their teaching and increase student learning (McIntosh 47).

A four-phase Action Research Cycle for inquiry into teaching and learning, developed by Mills and Butroyd and based on the work of Kurt Lewin, will be used for

this study (see Figure 1). The four phases of Mills and Butroyd's Action Research Cycle are: (1) the researcher identifies an area of focus; (2) the researcher collects data to clarify the focus; (3) the researcher develops and implements a plan of action; and (4) the researcher evaluates the plan of action and the need for another cycle of inquiry (7).

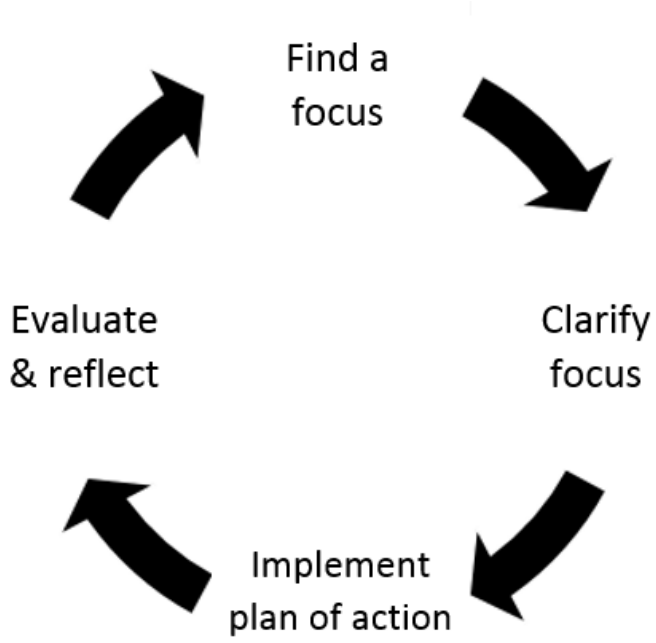

Figure 1. Four phases of Action Research inquiry designed by Mills and Butroyd (after the work of Kurt Lewin) from Mills, Geoffrey E. Mills and Robert Butroyd. *Action Research A Guide for the Teacher Researcher.* Harlow, England: Pearson Education Ltd, 2014. Print.

Because the goal of Action Research is to understand what learning is taking place in the classroom, it does not look for "ultimate truths," but rather looks at ways that teacher-researchers can use to improve learning in their classrooms (Mills and Butroyd 103). Richard Sagor explains that Action Research allows teacher-researchers to "design classroom interventions…that will enable our students to demonstrate proficiency…" (vii). A discussion about how Mills and Butroyd's four-phase Action Research Cycle was applied for this thesis research follows.

Phase 1: Identify an area of focus. According to Mills and Butroyd, in the first phase of an Action Research plan the researcher should "clarify the general idea" that will be the focus of the teaching and learning research (52). The impetus for the research of thesis was sparked during a collegial conversation about the need for HETM students to be more effective in their workplace technical communication with non-technical healthcare providers.

Initially, 15 undergraduate students from the Purdue School of Engineering were enrolled in the 2015 spring semester of TCM 38000, but only 14 students completed the course. One student stopped participating about mid-way through the semester; this student's work was not included in the research analysis.

Previous understanding about how tailoring messages can help communicate information more clearly to an audience provided the rationale for this investigation into whether students could learn and apply this technique in their technical communication submissions for TCM 38000 course assignments. Specifically, two research questions were developed for this study: (1) Can engineering and technology students enrolled in a technical communication course understand the concept of tailoring messages? If so, how will that understanding be shown in their course work? and (2) Can engineering and technology students enrolled in a technical communication course tailor messages in the technical communication they create for course assignments?

In course assignments that looked for this evidence, students were able to demonstrate they understood the concept of tailoring messages. In hindsight, this first research question did not go deep enough – it should have looked for evidence of *how well* students were able to understand the concept of tailoring messages in their work.

Action Research encourages teacher-researchers to reflect on their learning, therefore, this deeper exploration of the first research question appears as part of the data analysis in Chapter 4.

Phase 2: Clarify a focus. The second phase of Mills and Butroyd's Action Research methodology requires teacher-researchers to perform "a more rigorous approach to data collection" to clarify the study's focus. Data triangulation was used to analyze student work and determine the answers to the two research questions. Triangulation involves collecting data from three types of data sources to increase the likelihood that research findings are relevant to research questions (Mills and Butroyd 76). Mills and Butroyd explain that triangulation is used in Action Research so that teacher-researchers use more than one perspective about students' work to analyze their teaching (76). To provide a more robust perspective of the data, a total of six student assignments, listed below, were analyzed in this study (see Table 1 in Appendix A). Each of these assignments is more fully described later in this chapter.

- An open-ended question in precourse and postcourse assessments in which students were asked to describe their knowledge about and experience with tailoring messages.
- A precourse and postcourse reflection that asked students to reflect on their experiences with health communication.
- A writing assignment that required students to use tailored messages in a User Manual.
- A reflection in which students discussed the writing decisions they made for their User Manuals.

Phase 3: Implement an action. In the third phase of an Action Research plan, teacher-researchers implement the action (Mills and Butroyd 138). An individual level of planning was performed for this thesis. Mills and Butroyd explained that an individual level planning focuses on an issue related to "curriculum pedagogy, assessment, classroom management or community involvement," with the primary audience for research findings being the individual instructor (142).

Before the beginning of the 2015 spring semester, the proposed study to evaluate student work was submitted to Indiana University's Institutional Review Board (IRB) for Exempt status. The IRB approved the study on January 29, 2015. Once the study was approved, content in TCM 38000 was modified so that students could scaffold their learning about tailoring messages through textbook readings, class discussions, and assignments. A discussion about the modifications made to the course follow.

Two textbooks were used in TCM 38000: *Writing Health Communication: An Evidence-Based Guide*, edited by Charles Abraham and Marieke Kools, and *Communicating Health: Strategies for Health Promotion*, edited by Nova Corcoran. Readings from the textbooks defined tailoring messages and discussed how tailored messages can help communicate information more clearly to the recipient.

At the beginning of the TCM 38000 course, students are asked to complete an online assessment of their technical communication abilities (see Appendix B). A question was added to the 2015 spring semester precourse assessment that asked students to rate their ability to use tailored messages for specific purposes and audiences. This question was created to determine if students had prior knowledge about tailoring messages or had previously tailored messages in their technical communication. The

same question was included in a postcourse assessment to determine if students could articulate their understanding about the concept after they completed the course.

Shortly after the 2015 spring semester began, students were asked to write a reflection about their experiences with health information or instructions. The purpose of the reflection was to determine if students had prior experience with tailored messages and to determine their ability to consider an audience's information needs about technical communication before they write. The same reflection was assigned at the end of the semester to see if students could explain how and why tailored messages are used after they completed the course.

TCM 38000 is an online class that has weekly synchronous class meetings. The format for class meetings began with an instructor-led short lesson about key concepts from course readings, followed by class discussion about those concepts. The topic for two of the online synchronous class discussions focused on tailoring messages. In the first meeting, additional resources about tailored messages in health communication were brought into the class discussion about information from course readings (see Appendix D). The second meeting focused on the User Manual assignment and the class discussion focused on how tailored messages help audiences understand technical information or instructions. This discussion was designed to help students think about how they would use tailored messages to develop their User Manual.

The existing User Manual and User Manual Reflection assignments in TCM 38000 were slightly modified to incorporate the concept tailoring messages. The User Manual assignment requires students to create instructions for a tool, mechanism, or piece of equipment. Although written instructions for assignment were not changed,

students were given oral instructions during an online class discussion about this assignment to tailor messages in their manuals for a specific end-user. Students were required to reflect on the writing choices they made for their manuals in their User Manual Reflections (see Appendix F). The User Manual Reflection assignment has questions to prompt students' reflections. To help target this communication skill, a question in the User Manual Reflection assignment asked students if they used tailored messaging in their manuals, and if so, how they tailored messages.

Phase 4: Evaluate and reflect. Teacher-researchers use the final phase of Mills and Butroyd's methodology to choose what will be evaluated to determine the impact that the plan of action had on learning (155). The plan of action for this thesis research was to modify parts of the TCM 38000 course, develop research questions and analyze student work in course assignments to find the answers for thesis research questions. The results of the evaluation will be used to reflect on changes to TCM 38000 that will improve student learning about tailored messages for their technical communication.

Precourse Objectives Self-Evaluation Assessment

Within the first week of the course, students were assigned a precourse objectives self-evaluation assessment (see Appendix B). The 15 open-ended question assessment required students to rate their abilities with course objectives, provide an explanation for each rating and discuss experiences with the strategies or processes associated with each objective. The second question in this assessment asked students to rate their ability to use or adopt a style by tailoring the message for specific purposes and audiences. This question was added to see if students had previously tailored messages in their technical writing and could explain that previous experience.

Precourse Reflection about Health Communication

Near the beginning of the semester, students were asked to write a short essay in which they reflected on their experiences with health communication (see Appendix C). Students were asked to answer two questions in their reflection: "Have you ever received health information or instructions that were difficult to understand?" and "What do you think the writer could have done to make that information or those instructions more understandable?" The purpose of this assignment was to see if students knew how tailored messages can improve communication about technical information.

User Manual and Reflection Assignments

The penultimate assignment for this class, creating a User Manual, provided an opportunity for students to tailor messages in one type of writing they might be expected to do in the workplace. The User Manual assignment required students to write operational instructions about a tool, mechanism or piece of equipment (see Appendix E). After finalizing their User Manual, students were required to write a Reflection to describe the writing decisions they made for their manuals (see Appendix F).

Postcourse Objectives Self-Evaluation Assessment

The questions for the postcourse objective self-evaluation assessment were exactly the same as the precourse assessment. As such, the second question asked students again to rate their ability to adopt a style by tailoring the message and to explain their rating. The purpose of asking this question at the end of the semester was to see if students believed they improved their ability to tailor messages in their technical writing after they completed the course.

Postcourse Reflection about Health Communication

The TCM 38000 course included a final reflection assignment that asked students to re-read their precourse reflection, discuss again how a writer of health care instructions could make information more understandable and reflect on what they learned from the course that could help them write instructions or information in their field (see Appendix G). The purpose of this postcourse reflection was to see if, after they completed the course, students could explain how tailoring messages could help communicate information more clearly to the audience.

Coding Methodology

Student responses for the precourse and postcourse objectives self-evaluation assessments and the precourse and postcourse reflections about health communication assignments were double coded for the evaluation process. The rationale behind the double-coding process follows.

Coding of Precourse and Postcourse Objectives Self-Evaluation Assessments

A double-coding step was used to assess each student's response to Question 2 in the precourse and postcourse assessments. First, each student's precourse assessment

Question 2 response was read and compared to the Question 2 response in the postcourse assessment to ensure that responses were different (i.e., the student did not copy their response from the precourse assessment for their submission to the postcourse assessment). All student responses to Question 2 were unique for the precourse and postcourse assessments. Next, each student's response to Question 2 in the postcourse assessment was read again and coded as being better, the same as or worse than their precourse survey response (see Table 2 in Appendix A).

A postcourse Question 2 response was coded "better" (1) if it met at least one of the criterion described below.

- Correctly used the term "tailoring messages" (or some variation of that phrase) to describe customized information to a specific audience, used terms or content from course readings or class discussions to describe the concept of tailoring messages or accurately described tailoring messages without using terms from course readings and class discussions.
- Contained a more detailed or more complete discussion about tailoring messages than was present in the precourse response. A response was considered more detailed if the student physically wrote more about tailoring messages. A response was considered to be more complete if the student used examples from their own experiences, course readings or class discussions to support their discussion.
- Showed that the student understood the concept of tailoring messages through a discussion about personal experiences, explained how tailored messages help communicate technical information more clearly to the

recipient or provided other insight into tailored messages and technical communication.

A Question 2 postcourse response was coded "neutral" (0) if it did not add any new discussion or information about tailoring messages than what was present in the precourse assessment response.

A Question 2 postcourse response was coded "worse" (-1) if it met at least one of the following criterion.

- Incorrectly described tailoring messages or incorrectly used the phrase "tailoring" (or any version of the verb) incorrectly.
- Contained little or no discussion about how and why tailored messages are used.
- Failed to show any signs of the student understanding the concept of tailoring messages.

A summary of the coding results for students' responses to Question 2 in the precourse and postcourse assessments and an interpretation about the data is provided in Chapter 4.

Coding of Precourse and Postcourse Reflections about Health Communication

The precourse and postcourse reflections about health communication were also double coded, using the same process and criteria as was used for the precourse and postcourse assessment responses (see Table 3 in Appendix A). Five students did not complete the postcourse reflection assignment. Since the postcourse reflections about health communication were unavailable for these five students, they could not be

compared to their precourse reflections; therefore, both the precourse and postcourse reflections for these students were not evaluated.

Coding of User Manual and Reflection Assignments

The User Manual was evaluated for this thesis research using a 4-point scale, described below (see Table 4 in Appendix A). Although written instructions for the User Manual assignment were not changed, students were given oral instructions during an online class discussion about this assignment to tailor messages in their manuals for a specific end-user. The User Manual Reflection was used to understand the writing choices students made to tailor messages in their User Manuals.

- If the student's User Manual Reflection clearly described how they tailored messages in their manual and described the end-user for whom the manual was written, one point was given. If the reflection did not discuss how the student tailored messages or did not describe the end-user of the manual, no point was given for this criterion.
- If the User Manual defined all terms, jargon or acronyms to support an end-user's understanding of the information, one point was given. If a manual contained one or more undefined terms, jargon or acronyms, no point was given for this criterion.
- If the User Manual assignment contained visual elements, including screen shots, illustrations, shapes and other graphical (i.e., non-textual) elements that would improve understanding of textual information, one point was given. If the manual did not contain visual elements or the visual elements

did not support understanding of textual information, no point was given for this criterion.

- The teacher-researcher had no previous experience with the devices described in the User Manuals. The teacher-researcher read the manuals to evaluate if the writing and content could be understood. In addition, since only half of U.S. adults can read a book written at an eighth-grade reading level or below ("Did You Know?" para 1), each User Manual was evaluated to see if it was written at an eighth-grade reading level or below, using the Flesch-Kincaid readability statistics in Microsoft Word. A User Manual that had little or no grammatical, mechanical, typographical and spelling errors in it, was written and organized so that that the teacher-researcher could understand the content and that was written at an eighth-grade level or below received one point for this criterion. No point was given for a manual that had significant grammatical, mechanical, typographical and spelling errors in it, was written and organized in a way that made it difficult for the teacher-researcher to understand the content or was written at an reading level above eighth-grade, unless it met the scenario described below.
- If a student indicated in their User Manual Reflection that the manual assignment was written intentionally for an end-user who read above an eighth-grade reading level, and the manual had little or no grammatical, mechanical, typographical and spelling errors in it and was written and

organized so that that the teacher-researcher could understand the content, then one point was given for this criterion.

A summary of the analysis for students' final version User Manuals and associated Reflections, along with a discussion about the interpretation of that data, is provided in Chapter 4.

Chapter 4: Research Results and Analysis

This chapter provides the evaluation of student work for this thesis and the rationale for that evaluation to answer the research questions posed in Chapter 1. Prior to analysis and assessment, all student assignments were de-identified, with a random number assigned to each student for identification. This number will be used to discuss the analysis and results of student work in this chapter. To help maintain student anonymity, the gender-neutral pronoun "they" will be used when discussing the work of a single student or multiple students.

Precourse and Postcourse Objectives Self-evaluation Assessment

The postcourse responses of seven students (Students 2, 4, 8, 9, 10, 11 and 12) were coded as better, because in them, students wrote about how tailored messages help communicate information in the message more clearly to the audience. In one additional response, the student (Student 15) described struggling with writing tailored messages. Since Student 15's discussion showed an understanding about the concept of tailoring messages, even though they struggled with writing a tailored message, their postcourse response was coded as "better" too.

Two student postcourse responses (Students 3 and 7) were coded as neutral because the discussion in them did not contain any new ideas or information from the precourse responses.

Four students' postcourse responses were coded as worse. One student (Student 5) explained in their postcourse response that they often assume everyone in the audience "is on the same page." The response from Student 5 indicates they did not understand the concept of tailoring messages. Three other postcourse assessment responses (Students 1,

6 and 14) were coded as worse because the students included the term "tailoring" or "tailored" but nothing else in their responses demonstrated knowledge about tailored messages or how these students tailored messages in their work.

Finding that more than half of the class (seven students) was able to clearly communicate that their ability to tailor message had improved because of course materials and the work they did for course assignments suggests that students can learn how to tailor messages in their technical communication.

Precourse and Postcourse Reflections about Health Communication

Eight postcourse reflection about health communication (Students 1, 3, 5, 7, 9, 10, 11 and 14) were coded as being better because in them students described how they would use tailored messages to help communicate health information or instructions more clearly to the audience. Some of the responses in these eight postcourse reflections discussed writing that "makes the information easier to understand" (Student 1), "tailor[s] the messages to be the most effective" (Student 7), and was "tailored to the audience they are trying to write to" (Student 5). These comments and others like them demonstrated that these students understood that tailored messages are used to help communicate information in the message more clearly to the audience. As previously mentioned, five students (Students 2, 4, 8 and 15) did not submit postcourse reflections.

No postcourse reflections were coded as neutral because all of them had different responses from their corresponding precourse reflections. Some students did reference their precourse responses in their postcourse reflection discussions because the assignment instructions asked them to reflect on what they wrote at the beginning of the

course. However, because these postcourse reflections also included new information in them, they were considered different from precourse reflections.

Two postcourse reflections were coded as worse. In their reflection, one student (Student 6) did not discuss any writing choices that could be made to help communicate health instructions or information more clearly to the recipient. Another student's postcourse reflection (Student 12) talked about creating a health information pamphlet "tailored to age groups," but suggested the most effective way to tailor messages was by a "phone call from an expert." Because the reflection question specifically asked about how to improve written communication and the focus of the class was on written tailored messages, this postcourse reflection was coded as worse.

The discussions in the postcourse reflections indicate that the majority of students in the class (8 students) were able to explain how tailoring messages could help communicate information more clearly to the recipient.

User Manual and User Manual Reflection

The User Manual and User Manual Reflection assignments were evaluated using a four-point scale to look for student demonstration of tailored messages in their manuals. First, the User Manual Reflection was read to see if students could explain how they tailored messages in their manual. Next, the User Manual was evaluated for evidence of the tailored messages that students described in their User Manual Reflections. Although written instructions for the User Manual assignment were not changed, students were given oral instructions during an online class discussion to tailor messages in their manuals to a specific end-user. The assessment of this four-point criteria assessment follows.

In almost all (13) of their User Manual Reflections, students said they tailored messages in their manuals. The User Manual Reflection of only one student (Student 4) received no points for this criterion because they did not explain how they tailored messages in their manual. Looking deeper though, only eight of the 13 User Manual Reflections provide a full description of how students tailored messages in their manuals. Having little more than half of the students in the class describe *how* they tailored messages was not necessarily reflective of their *ability* to tailor messages. The majority of students were able to show their ability to tailor messages in their User Manuals (more detail is provided later in this section), even if the explanations about their processes were fairly weak in their User Manual Reflections. The disconnect between being able to tailor messages in their manuals but not fully discussing those writing decisions might be because some students have never been asked to reflect on their writing in a class before, so they have little practice articulating these ideas. Another reason might be that since students don't understand the value that reflecting can have on their writing they did not fully complete the assignment. The poor discussion about writing decisions in student User Manual Reflections also may be that some students placed a greater value on completing the User Manual assignment and less value on the User Manual Reflections – possibly because they are not expected to reflect on their work in other courses or possibly because the points for the User Manual Reflections assignment were not high enough to encourage students to complete the assignment. Finally, because this assignment was due near the end of the semester, when students tend to be burdened with assignment due dates in multiple classes, some students might not have had the time to sufficiently complete the assignment by the due date.

Thirteen of the User Manuals defined terms or jargon in them or did not use technical terms or jargon at all. These 13 manuals scored one point for this criterion. Only one student's manual contained undefined terms or jargon and was scored as 0.

The instructions for the User Manual required students to include visuals. All 14 of the User Manuals contained screen shots, photographs or illustrations that supported understanding about the text and were scored as one for this criterion. However, in their User Manual Reflections, more than half of the class (Students 2, 7, 8, 9, 10, 11,12, 14 and 15) specifically described how their choice of visuals related to their tailored messages. For example, Student 10 explained in their User Manual Reflection, "…using graphics that pertain to the information is more beneficial and can help the reader follow the instructions and know exactly how to use the device if they have no background or prior information about it." In their User Manual Reflection, Student 2 described how they chose font color, heading styles and font styles (e.g., bolding, italics), in addition to photographs, to draw the reader's attention to important information. Explaining how visuals are used to tailor messages and support reader understanding of content shows that these nine students fully understand how tailored messages can be used to communicate technical information.

The User Manual was also evaluated for readability. Because the teacher-researcher was a novice user for all of the devices described in students' User Manuals, this criterion was primarily evaluated by her ability to understand the information in the manuals. In addition, the Flesch-Kincaid reading level score in Word was used to determine if the User Manual was written at an eighth-grade reading level (or a higher reading level, if the student explained in their User Manual Reflections that their

audience had a higher reading level). Ten of the User Manuals were scored as meeting the readability criterion. Three User Manuals did not meet the readability criterion. In one User Manual information was repeated in different sections, which made it difficult to follow the process being documented. In addition this manual contained photographs, but these photographs did not have corresponding written instructions, so it was unclear what instruction was being portrayed. The second manual that received no points for this criterion had incorrect grammar, confusing word choices and run-on sentences that made the information difficult to read and understand. The third manual that did not meet the criterion had technical terms that were not explained anywhere in the manual, and neither the User Manual Reflection for this User Manual nor the User Manual itself explained how the end-user for this manual would understand those terms.

Of the 15 User Manuals evaluated, 11 received all 4 points, indicating that these writers explained in their User Manual Reflections how they considered their audiences' information needs and then tailored messages in their manuals to help communicate information more clearly to those end-users. Three manuals scored three points, indicating these writers had some ability to tailor messages. Only one manual scored two points, indicating this student had a lower ability in developing tailored messages in their writing.

In-Depth Analysis of the User Manual Reflection

The User Manual Reflection was an important moment for assessing student learning because in it students explained how they understood the concept of tailoring messages and how they tailored messages in their User manuals. This section will take a detailed look at students' User Manual Reflections to get a deeper understanding of the

ways some students understood the concept of tailoring messages and tailored messages in some of their work.

An analysis of the User Manual Reflections found that most students used at least one of three techniques to tailor messages in their User Manuals. These students used what they learned through course materials and discussions to reach beyond their learning and come up with these techniques on their own. The three techniques were used to determine the end-user's information needs and then to tailor messages to address those needs. The three techniques were choosing words that would be easy for their end-users to understand, thoughtfully choosing which information to include or exclude in their manuals based on the end-users' needs and using role-play to experience using their device as the end-user.

Several students wrote about the word choices they made to tailor content in their manuals. Specifically, these students described using language so that readers would easily understand the information in their manuals. In their reflection, Student 10 explained "…keeping the instructions simple and short was important because using too many words might confuse the reader." Student 2 described decisions about both word choice and the characteristics of the font, explaining, "that is why keeping [the writing] simple and making important point[s] in bold, italic, or red font" was used to tailor messages.

Another way some students tailored messages was through the information they included in their manuals – and equally important, the information they excluded. For example, Student 6 wrote that tailored messages "…guide me in choosing what details to include or forego." Similarly, when describing content choices they made to develop

their manual, Student 7 explained, "I wanted to…leave out anything that was unnecessary. In this way, I was able to tailor my material to my end-user." Three more students explained that they tailored their manuals by excluding information they felt was irrelevant for their end-users to know.

A final common way some students tailored messages was by imagining they were the end-user through role-play. In describing how they used role-play, Student 11 wrote, "First I went through the motions of how to use the device…" so that they could tailor instructions to the end-user. In their explanations of how they tailored messages using role-play, five additional students said they used their devices as their end-user would or asked someone with a background similar to their end-user to follow their draft instructions and provide feedback so they could think about the information in their manuals, as Student 15 explained, "…from other people's perspectives. "

The content from User Manual Reflections analyzed in this section demonstrate that more than half of the students in the TCM 38000 course effectively articulated that they understood how to tailor messages and could explain the processes they used tailor messages. In addition, the User Manual Reflections of several students showed that they reached beyond what they learned through course readings and class discussions to think about their end-user's information needs – and how tailored messages help communicate information more clearly to those end-users.

Two specific questions were presented in the beginning of this thesis as a way to address the objectives of this study. Responses to those research questions, based on the analysis of student work for course assignments, are provided below.

Can engineering and technology students enrolled in a technical communication course understand the concept of tailoring messages? If so, how will that understanding be shown in their course work? Student responses to the second question in precourse and postcourse objectives self-evaluation assessments, student discussions in a precourse and postcourse reflections about health information and the User Manual Reflection assignment were analyzed to determine the answer to this question. The assessment of student work previously discussed in this section shows that students were able to demonstrate their understanding about the concept of tailoring messages through their self-evaluation assessment responses, postcourse reflections about health information and User Manual Reflections. A more accurate research question would have looked deeper and asked *how well* students can understand tailoring messages, given the course materials used. Since some students demonstrated this deeper level of understanding in their work, the following discussion looks at answering this deeper research question.

In their postcourse self-evaluation assessment responses, more than half of the class (8 students) demonstrated through detailed discussion about tailoring messages, their use of terms from course readings and discussions, personal examples and word choices that they learned how tailored messages help communicate technical information more clearly to the recipient.

In the postcourse reflections about health communication that could be evaluated, the majority of students (8) demonstrated through their comments that they understood how to use tailored messages to help communicate information more clearly to an end-user. Some discussion of this demonstration include explaining how a writer of health

care information should tailor a message that makes the information easier to understand, consider the characteristics of the audience to make information more relevant to them and use visuals that support the text as a way to help communicate information more clearly.

Finally, students' User Manual Reflections were evaluated to see how well students understood the concept of tailoring messages. In the majority of these User Manual Reflections, students explained techniques they independently devised to better understand their end-users' information needs and how to tailor messages to help communicate that information more clearly to their end-users. This ability to take information learned through course readings and discussion and move beyond it in their work demonstrates that the majority of students in the class understood how tailored messages help communicate technical information more clearly to the audience.

Results of student work for three different course assignments demonstrate that the majority of students enrolled in the 2015 spring semester of TCM 38000 can describe tailoring messages and how tailoring messages could help communicate information more clearly to the recipient.

Can engineering and technology students enrolled in a technical communication course tailor messages in the technical communication they create for course assignments? An evaluation of students' User Manuals, User Manual Reflections and precourse and postcourse reflections on health communication showed that the majority of students in the course successfully tailored messages. Almost all students' User Manuals contained tailored messages. In their User Manual Reflections, the majority of students described techniques they used to tailor messages in their

manuals to help communicate technical information more clearly to their end-users. In their postcourse reflection about health communication, the majority of students explained how they would tailor messages to help communicate health information more clearly to the patient. These postcourse reflections demonstrate that students understood how tailored messages help communicate technical information more clearly to the audience.

Overall, the modifications made to 2015 spring semester TCM 38000 course were successful in helping students begin to learn about tailoring messages and create messages tailored for a specific end-user in their technical communication developed for some course assignments. A reflection about the course and the research implications from this study's findings are presented in the next chapter.

Chapter 5: Reflection on the Course and Research Implications

Reflections on the Course

Within this small sample of 14 students, the majority of student work demonstrates understanding about tailoring messages and student ability to tailor messages in their technical communication. The final cycle of Mills and Butroyd's Action Research methodology requires teacher-researchers to reflect on changes needed to improve student learning that were revealed through research analysis. Some of the TCM 38000 course materials will be modified so that students can gain a deeper understanding about tailoring messages and can have more opportunities to practice writing tailored messages in course assignments. The ways to improve course content that came from reflecting on research results are described below.

Many students in the 2015 spring semester of TCM 38000 were unaware of the communication challenges HMTs face when explaining technology to non-technical healthcare providers in the workplace. Prior to discussing tailoring messages and why they are used, students will be required to read articles written by HMTs and healthcare providers about those communication challenges. An online reading discussion assignment will be added that will ask students to discuss the ideas presented in those articles. An online class discussion will focus on what challenges students think will affect their workplace communication and their ideas of how they might address to those challenges.

Most students in the TCM 38000 course have not learned how communication styles impact information needs. The course will be modified further to teach students about different communication styles and how communication styles influence

information needs. First, students will complete a free online evaluation to learn about their own communication style. Students will read journal articles about communication styles and how communication styles impact information needs, and then complete an online reading discussion assignment about those ideas. During an online class meeting, students will learn about and practice techniques that help people with disparate communication styles effectively communicate in the workplace. Once students have an understanding about communication styles and information needs, the concept of tailored messages in technical communication will be introduced through course readings and class discussions. Building this base of knowledge about communication styles and information needs first will help students scaffold new ideas about tailoring messages onto their previous knowledge.

A bit more than half of the students in TCM 38000 were able describe in their User Manual reflections *how* they tailored messages in their manuals. Before students begin developing their User Manual they will be required to write about the end-user for the manual. In this writing assignment students will be directed to describe their end-user's communication style, information needs, reading level, previous experience using the device, comfort with using the device, comfort with using technology and any other relevant information that students will use to tailor messages about the technical information in their manuals.

The User Manual assignment will be modified to expressly state that tailored messages be used to help communicate technical information more clearly to the manual's intended end-user. Although this instruction was missing from the assignment through an unintended oversight, it was explicitly and completely discussed during the

online class meeting in which the assignment was described. In addition, the requirement that the audience be a novice user will be removed from the Users Manual assignment so that students will be able to tailor messages in the manual for the end-user of their own choosing and so the User Manual assignment is more meaningful for students.

Students will be asked to briefly discuss during a class meeting their experiences when creating tailored messages for their User Manuals as another way to help students describe *how* they tailored messages in their manuals. The purpose of this assignment will help students think about the writing choices they made, with the hope that their discussions about writing decisions in their User Manual Reflections will be a bit more robust if they have previously reflected on the experience. User Manual Reflection assignment will be modified also to ask students to fully describe the writing decisions and include specific examples of where they tailored messages to support their end-user's communication and information needs. Additionally, the number of points for the User Manual Reflection assignment will be increased so that students perceive more value in completing the assignment.

Finally, Question 2 in the precourse and postcourse self-evaluation assessments ("Rate your ability to adopt a style by tailoring the message and tone to be appropriate for specific purposes and audiences") will be revised. The purpose of the question was to determine students' prior knowledge about or practice with tailored messages, without potentially skewing their answers by giving too much information in the question. However, the wording is a bit clunky and confusing. This question will be revised so that it clearly asks students to describe and evaluate their ability to tailor messages in their technical communication.

This small-scale research found that students in a technical communication class were able to demonstrate in some of their course assignments that they understood the concept of tailoring messages and were able to tailor messages to a specific audience However, more research about tailoring messages for technical communication is needed. In addition to incorporating the changes to TCM 38000 already described in this section, student assignments from several semesters should be collected and analyzed. Also, other technical communication courses should include a tailoring messages learning module. Data from these additional courses will provide more rich data about how tailoring messages can help end-users understand technical communication in other fields, such as computer programming, biomedical science and environmental engineering.

Research Implications

Despite a large body of work on the positive impact that tailored messages can have on improving patient understanding about health communication, no research was found that studied how tailoring messages might be used to help communicate technical information in healthcare professions. More research is needed to study how teaching HMTs about tailoring messages might improve their ability to consider how healthcare providers' prefer to receive technical information and how they can more clearly communicate that technical information to these healthcare providers.

This study looked at one possibility for teaching students how to tailor messages in a technical communication for healthcare professions course. The ideas presented here can be applied more broadly, though. Learning about and tailoring messages can improve the communication between any two disparate groups of technical and non-

technical audiences. The ideas discussed in this thesis can be expanded beyond the classroom into workplace training for organizations that have both technical and non-technical employees that must effectively communicate. Communicators of technical information in the fields of mechanical engineering, software development, regulatory compliance and pharmaceutical manufacturing, to name a few, can benefit from learning about tailoring messages and writing tailored messages to communicate technical information more clearly to non-technical employees, customers, regulators and decision-makers.

Appendix A: Tables

Table 1. Triangulation of data sources

Research Question	Data Source		
	1	2	3
Can students understand the concept of tailoring messages? If so, how will that understanding be shown in coursework?	Precourse and postcourse survey	Precourse and postcourse reflection on health communication	User Manual reflection
Can students apply tailoring messages in their technical health communication?	User Manual assignment	User Manual reflection	Postcourse reflection on health communication

Table 2. Comparison of students' responses for Question 2 in precourse and postcourse objectives self-evaluation surveys

No.	Different? 1=Yes 0=No	Comparison 1=better 0=neutral -1=worse	Comments	Examples
1	1	-1	Used terminology ("tailor message"), but missing discussion about what that means, why it is used.	
2	1	1	Explained how tailored messages were used to help audience understand technical information.	"I learned how to identify the reader and tailor the message to their understanding. I cannot make the message hard to read for the average user."
3	1	0	Similar discussion in precourse and postcourse responses about using different styles of writing when sending emails and writing class assignments .	.
4	1	1	Explained how tailored messages used to change behavior/support understanding.	"I have used tailored messages to tackle some complex behavior patterns. I would like to improve effectively on how to use the key components in computer tailored messaging."
5	1	-1	Does not understand why tailored messages are used.	"I tend to at times forget about the audience and think that everyone is on the same page."

6	1	-1	Used terminology but no discussion about what that means, why it is used.	
7	1	0	Had previous knowledge and application of tailoring messages in healthcare. Did not discuss a change in knowledge or application because of course.	
8	1	1	Explained how tailored messages are used for a specific audience.	"I think I could improve [healthcare information] by tailoring to a more specific healthcare audience."
9	1	1	Explained how tailored messages are used for a specific audience.	"I think I learned a lot of great strategies for creating tailored messages. I think I can now develop messages that effectively reach the audience they are intended for."
10	1	1	Explained how tailored messages are used to support understanding.	"I can easily tailor my message…to the audience once I know who my audience is and what the topic is. I know how to make sure I speak about information that is useful to them."
11	1	1	Explained how tailored messages are used for a specific audience.	"…I have learned quite a bit in tailoring a message for the audience." and "…I am able to craft a message specifically for a certain audience."

12	1	1	Understands how tailored messages work. Clarified, how they will use it.	"Depending on my level of comfort with the subject matter; I may or may not be able to tailor the message appropriately."
14*	1	-1	Used terminology ("tailor") but no discussion of what that means, why it is used	.
15	1	1	Understands how tailored messages work, but may be struggling with how to tailor a message.	"…sometimes I think to deep about the message or specific audience I am trying to reach."

*#13 assigned to student who stopped participating in the class mid-semester.

Table 3. Comparison of students' precourse and postcourse reflections about health communication

No.	Different? 1=Yes 0=No	Comparison 1=better 0=neutral -1=worse	Comments	Examples
1	1	1		"A writer … could tailor the message that makes the information easier to understand…" and "Use visuals with their explanations so that patients could understand [information]." and "They [writers of health information] could make the information short and concise so there is not a lot of other un-needed information." and "Knowing how to use visuals and tailoring will get my information across better."
2	N/A	N/A	Student did not submit postcourse reflection.	
3	1	1		"I learned from this class about understanding what the audience already knew about the topic in order to tailor the message to them." and "I also learned about tailoring it [information] to the audience in regard to age and gender [and] categorizing information and making it stand out using bold and underlining…as well as using visuals effectively."
4	N/A	N/A	Student did not submit postcourse reflection.	

5	1	1		"I think health care instructions should be tailored to the audience they are trying to write to. I think instructions should be clear for the audience to understand." and "I will pay special attention to the audience I am writing to [when writing instructions in the future] and make sure that the message that is trying to be conveyed is directed at them and easily understandable for them."
6	1	-1	No discussion about tailoring message strategy and its use in postcourse reflection.	.
7	1	1		"I can imagine that the individual who wrote those instructions [described in precourse reflection] was either a doctor or a nurse who did not think about their audience." and "had he or she considered who was going to be reading the instructions, [they] would have been written in a simpler language that the average patient could understand."
8	N/A	N/A	Student did not submit postcourse reflection.	
9	1	1		[The health information discussed in the precourse reflection that was easily understood must have been developed using] concepts such as…tailoring your message to your intended audience." and "[What he learned in this class can be used to] better engage my audience…"

10	1	1		"A writer of health care instructions/information can make sure the instructions that is given is easy to read and follow." and "Bolding [text]…and having graphics…make it easy to follow and read the instructions because it catches your eyes…and helps you have a better understanding…"
11	1	1		"If I were to create a brochure for a healthcare company [as a result of what was learned in the course], I would start by recognizing my audience." and "[I would add visuals to instructions so that] there is no ambiguity, [the recipient] would know exactly what to do…" and "I would make the steps [of the instructions] easy to read…"
12	1	-1		"[Patient instructions] could be done in a better way…tailored to age groups…" and "a …phone call from an expert would be the quickest and most effective method [of improving health communication."
14*	1	1		"To me, keeping the user in mind goes a long way in making good healthcare communication." and "…Is the text easy to understand? Are words being used that that any reader can understand?"
15	N/A	N/A	Student did not submit postcourse reflection.	

*#13 assigned to student who stopped participating in the class mid-semester.

Table 4. Evaluation of User Manual and User Manual Reflection assignments

No.	Tailoring explained 1=yes 0=no	Undefined terms 1=yes 0=no	Visuals 1=yes 0=no	Clear and concise writing? 1=yes 0=no	Comments
1	1	1	1	1	Reflection explained how tailored messages used for specific end-user. Manual described how device is used and visuals used to clarify parts of device and their uses. Readability: Unable to use readability software for this submission.
2	1	1	1	1	Reflection explained how tailored messages were used, decisions made about what info to include. and how formatting supports understanding of information. Manual includes Purpose section to describe how device is used, visuals help clarify instructions. Readability: 8.2

3	1	1	1	0	Reflection explained how tailored message were directed to a specific end-user, decisions made about why information was included/excluded based on end-user info needs. Manual includes Overview section to describe device and what it is used for, functions of device, and other equipment needed. Visuals help clarify instructions, but some process steps not documented. Readability: 6.7
4	0	1	1	0	Reflection does not describe communication strategy used to create manual. Visuals help clarify instructions, but information appears in two places and some text is confusing. Readability: 8.3
5	1	1	1	1	Reflection explains how tailored messages used for a specific end-user with some technical experience. Manual includes Introduction section to define process, visuals with callouts clarify instruction; arrows used to draw reader's attention. Readability: 9.4

6	1	1	1	1	Reflection explained how student put themselves in shoes of coworker end-user to determine information needs (include and exclude info) and tailor messages. Manual includes purpose, warning information and equipment needed for device. Visuals clarify instructions and include a hand performing each task. Readability: 11.1
7	1	1	1	1	Reflection explained student played with device, and did online research so they used correct terminology and understood functionality of device. Described how they chose the tasks the end-user would want to know how to do. Manual includes explanation about how device works and best practices. Visuals with callouts help clarify instructions and draw reader's attention. Readability: 7.1

8	1	1	1	1	Reflection explained that student tailored messages so end-user would feel the instructions were more personable. Manual includes Introduction to discuss disease and describe device, instruction steps use parallelism (each starts with an action verb), visuals help clarify instructions. Readability: 8.4
9	1	1	1	1	Reflection explained that manual was tailored for technical coworkers on how to use device. Photographs of device and callouts used to clarify information and draw reader's attention. Readability: 10
10	1	1	1	1	Reflection described how tailored messages used for a specific end-user, including decisions made to determine content of manual. Visuals with callouts used in manual to clarify information about device and draw reader's attention. Readability: 7.8

11	1	1	1	1	Reflection explained how student first assumed role of end-user to understand the device and to tailor messages appropriate for end-user. Manual describes why and how device is used, each step begins with an action verb (parallelism), photographs with hand showing task used to clarify information. Readability: 5.6
12	1	1	1	1	Reflection described how manual tailored for specific technical coworker – and that coworker was asked to usability test the manual. Student revised manual instructions based on coworker comments. Visuals with callouts help clarify instruction and draw reader's attention. Manual included troubleshooting section. Readability: 9.7

14*	1	0	1	0	Reflection explained that student had a non-technical user read their draft and then tailored messages to make instructions more clear and understandable. Manual used screenshots to clarify instructions. Manual included some undefined terms. Readability: 9.7
15	1	1	1	0	Reflection explained how information was tailored for a nurse, technical information was kept simple and visuals used to make instructions clear. Manual explained device and features. Photographs marked with arrows used to draw reader's attention and help clarify text. Some steps began with an action verb and were concisely written; others were not. Readability: 8.8

*#13 assigned to student who stopped participating in the class mid-semester.

Appendix B: Precourse Objectives Self-evaluation Survey

The following online survey was assigned to students in TCM 38000 and was due within eight days of the first class meeting. The second question was included in the survey to determine if any students had previous experience using a tailoring messages strategy in the writing they did for school or work.

Quiz Instructions:

- Take the Pre-Course Objectives Self-Evaluation here.
- Rate your perceived skill level for each of the course objectives right now. You will do this again at the end of the course.
- In order to get all points, you must answer both parts of the question - the rating (above average, average, or below average) and the sentences to explain your rating and your experiences.

Question 1 **1 pts**

Rate your ability to select, organize, and present technical information effectively to readers and listeners in a healthcare organizational setting

Give yourself a rating of either Above Average, Average, or Below Average for this objective, and explain why you gave yourself that rating. Write 2-3 sentences to discuss your experiences with this process, and discuss areas where you think you can improve.

Question 2 **1 pts**

Rate your ability to adopt a style by tailoring the message and tone to be appropriate for specific purposes and audiences.

Give yourself a rating of either Above Average, Average, or Below Average for this objective, and explain why you gave yourself that rating. Write 2-3 sentences to discuss your experiences with this process, and discuss areas where you think you can improve.

Question 3 **1 pts**

Rate your ability to write clear, concise, and accurate sentences.

Give yourself a rating of either Above Average, Average, or Below Average for this objective, and explain why you gave yourself that rating. Write 2-3 sentences to discuss your experiences with this process, and discuss areas where you think you can improve.

Question 4 **1 pts**

Rate your ability to make writing more accessible to readers by using headings, lists, white space, and layout.

Give yourself a rating of either Above Average, Average, or Below Average for this

objective, and explain why you gave yourself that rating. Write 2-3 sentences to discuss your experiences with this process, and discuss areas where you think you can improve.

Question 5 **1 pts**
Rate your ability to use effective visuals in written and oral reports.

Give yourself a rating of either Above Average, Average, or Below Average for this objective, and explain why you gave yourself that rating. Write 2-3 sentences to discuss your experiences with this process, and discuss areas where you think you can improve.

Question 6 **1 pts**
Rate your ability to write using a reader-centered approach, which focuses on tailoring the message to the needs of the reader over the writer's preconceptions.

Give yourself a rating of either Above Average, Average, or Below Average for this objective, and explain why you gave yourself that rating. Write 2-3 sentences to discuss your experiences with this process, and discuss areas where you think you can improve.

Question 7 **1 pts**
Rate your ability to create repeatable strategies for technical communication in healthcare settings.

Give yourself a rating of either Above Average, Average, or Below Average for this objective, and explain why you gave yourself that rating. Write 2-3 sentences to discuss your experiences with this process, and discuss areas where you think you can improve.

Question 8 **1 pts**
Rate your ability to identify the role of technology in communication in the healthcare industry.

Give yourself a rating of either Above Average, Average, or Below Average for this objective, and explain why you gave yourself that rating. Write 2-3 sentences to discuss your experiences with this process, and discuss areas where you think you can improve.

Question 9 **1 pts**
Rate your ability to identify rules, policies, and laws that govern communication in the health care industry.

Give yourself a rating of either Above Average, Average, or Below Average for this objective, and explain why you gave yourself that rating. Write 2-3 sentences to discuss your experiences with this process, and discuss areas where you think you can improve.

Question 10 **1 pts**
Rate your ability to select appropriate sources when conducting research.

Give yourself a rating of either Above Average, Average, or Below Average for this objective, and explain why you gave yourself that rating. Write 2-3 sentences to discuss

your experiences with this process, and discuss areas where you think you can improve.

Question 11 **1 pts**

Rate your ability to use the correct conventions when incorporating and acknowledging sources and preparing bibliographies.

Give yourself a rating of either Above Average, Average, or Below Average for this objective, and explain why you gave yourself that rating. Write 2-3 sentences to discuss your experiences with this process, and discuss areas where you think you can improve.

Question 12 **1 pts**

Rate your ability to write clear technical descriptions of mechanisms.

Give yourself a rating of either Above Average, Average, or Below Average for this objective, and explain why you gave yourself that rating. Write 2-3 sentences to discuss your experiences with this process, and discuss areas where you think you can improve.

Question 13 **1 pts**

Rate your ability to write clear, user-friendly instructions on a technical topic.

Give yourself a rating of either Above Average, Average, or Below Average for this objective, and explain why you gave yourself that rating. Write 2-3 sentences to discuss your experiences with this process, and discuss areas where you think you can improve.

Question 14 **1 pts**

Rate your ability to organize and write technical proposals.

Give yourself a rating of either Above Average, Average, or Below Average for this objective, and explain why you gave yourself that rating. Write 2-3 sentences to discuss your experiences with this process, and discuss areas where you think you can improve.

Question 15 **1 pts**

Rate your ability to identify areas of communication in which you need assistance or training and experience.

Give yourself a rating of either Above Average, Average, or Below Average for this objective, and explain why you gave yourself that rating. Write 2-3 sentences to discuss your experiences with this process, and discuss areas where you think you can improve.

Appendix C: Precourse Reflection

The purpose of the precourse reflection was to get an idea if any TCM 38000 students had any experience tailoring messages in their writing. The assignment as it appeared in the second learning module of the class is provided below.

Mod 2: Reflection About Understanding Health Information

Reflect back on your own experiences with health care communication. Have you ever received health information or instructions that were difficult to understand? What do you think the writer could have done to make that information or those instructions more understandable? The instructions or information may have been for your own health issue or maybe for someone who you advocate for - for example, your child or parent.

Write at least 2 complete paragraphs in a Word document and upload it in this assignment. Please don't divulge your personal health information. Instead, write about understanding the information or instructions. I'm looking for a fully developed, thoughtful reflection about the situation.

Appendix D: Instructor Notes for Tailoring Messages Module Online Classes

Instructor notes used as prompts for instruction and discussion about tailoring messages during two online class meetings.

TCM 380 Class Notes – 2 March

1. Tailored messages
    a. Information adapted for individuals usually matched to characteristics.
    b. Some research indicates that tailored messaging helps create engaged audiences.
    c. Engaged audiences are more likely to modify their behavior.
    d. Different from target communication that uses more general characteristics
        i. education level
        ii. race
        iii. gender
    e. Get the information from the patient or end-user
        i. Tailored messaging and interactive multimedia.
            1. End-user answers a series of questions on a web site that leads them to a specific piece of health information.
            2. VA developed a kiosk about hearing protection for former warfighters.
                a. Answered questions about what they were exposed to in the field.
                b. Plugged in their iPods, smart phones to determine decibel level they listen to music, phone conversations, etc.
                c. Provided printed materials about protecting their hearing.
            3. Interactive tailored messages may not be suitable for all instances. Why? (suggested responses below)
                a. Need IT support.
                b. Different algorithms to address all scenarios.
                c. Patient has to go to the equipment.
                d. Patient has to have computer equipment and computer literacy.
        ii. Don't need high tech equipment to tailor messages
            1. Interview your end-users with specific questions

    a. Doctors do this when they meet with patients
2. Develop written materials based on those interviews
    a. Create a database of written sections of instructions – reusable objects
    b. Build tailored instructions by using only those instructions the user needs

TCM 380 Class Notes – 9 March

1. Questions about tailored messaging
    a. How is learning about tailoring messages relevant for you?
    b. What type of writing will you be doing in the workplace where tailoring messages might be used to improve understanding or engagement with the information?
    c. How can we think about tailoring messages when developing technical information?
2. You will have to write instructions in a manual about a device for a specific person and use tailoring messages in that manual.
    a. How will you prepare?
    b. What questions do you need to ask your end-user?
    c. How will you use tailoring messages to make the information more meaningful for your end-user?
3. Why do you think knowing how to use tailoring messages is important for your workplace writing?
4. What information do you still need to understand what tailoring messages are and how they are used?

Appendix E: User Manual Assignment

The following assignment came after two online class meetings that focused on tailoring messages. During the second online class meeting, students were introduced to the User Manual assignment and asked to talk about the assignment in terms of tailoring messages. It was during this discussion, as well as subsequent reminders about that assignment, that students were directed to consider the end-user's information needs and use tailored messages in their manual. The part of the assignment that lists requirements about the User Manual is provided below.

Mod 5: User Manual
Audience: novice user
Length: 6-8 pages (includes visuals)
Task:
Select a tool, mechanism, or piece of equipment (e.g., nebulizer, MRI scanner, blood pressure monitor, glucometer) in your field to instruct users on how to use; if appropriate, use the item you described in Module 4. Do not choose something too large or too small. If the instructions for your tool, mechanism, or piece of equipment would take more than 8 pages, break the instructions down into parts and write your instructions on only one of the parts. **SPECIAL NOTE:** You can research, but please, please use your own knowledge and words.
Compose the draft of your User Manual. Be exact and thorough. Use all the principles of document design discussed in previous modules. Use LOTS of visuals. You're writing to a novice who will need them!

Appendix F: User Manual Reflection Assignment

The following reflection assignment was due after students received peer review comments and instructor feedback and finalized their User Manuals. The reflection assignment, as it appeared in Canvas, is provided below.

Mod 5: Reflection

After completing your final draft of your User Manual, take some time to reflect on the experience.

- What did you do (topic, audience, purpose, process used, etc.)?
- What was your process for developing the User Manual? How did you decide what information to include? to exclude?
- How would you describe the end-user of your User Manual?
- Did you use tailored messaging for your User Manual? If so, how?
- What did you learn about writing when developing your User Manual?
- How will this assignment help you in your field of study?

Appendix G: Course Reflection Assignment

The following reflection was part of an overall course reflection assignment in the final course module and was due at the end of the course.

Mod 6: Reflection

This question is about the entire course, please write at least 2 paragraphs in response to this question.

I asked the following question in Module 2: Reflect back on your own experiences with health care communication. Have you ever received health information or instructions that were difficult to understand? What do you think the writer could have done to make that information or those instructions more understandable? The instructions or information may have been for your own health issue or maybe for someone who you advocate for - for example, your child or parent.

Now that you have completed the course, go back and read what you wrote and answer that question again. What do you think a writer of health care instructions or information can do to help make those instructions or information more understandable? Why do you say that? How do you think what you learned in this class will help you when you have to write instructions or information in your field?

Works Cited

Abraham, Charles and Marieke Kools, editors. *Writing Health Communication: An Evidence-Based Guide*. SAGE Publications, 2012.

Arquilla, Lauren and Nicholas Cram. "The Relationship Between Clinical Engineers and Nurses in the Hospital." *Journal of Clinical Engineering.* 30.2 (2005): 100-103. *Ovid.* Web. 26 May 2015.

Åström, Kristina, Catherine Duggan and Ian Bates. "Developing a Way to Improve Communication Between Healthcare Professionals in Secondary Care." *Pharmacy Education.* 7.3 (2007): 279-285. *EBSCO.* Web. 26 May 2015.

Campbell, Marci Kramish and Lisa M. Quintiliani. "Tailored Interventions in Public Health: Where Does Tailoring Fit in Interventions to Reduce Health Disparities?" *American Behavioral Scientist*. 46.6 (2006): 775-793. *ProQuest Central.* Web. 3 March 2015.

Cockey, Carolyn Davis. "Technology and Patient Care Biomedical and Nursing Experts Discuss Current Issues and Future Challenges " *Healthcare Technology Horizons.* 28.2 (2007): 79. *Journals@Ovid LLW Total Access Collection*. Web. 01 June 2015.

Corcoran, Nova, editors. *Communicating Health Strategies for Health Promotion.* SAGE Publications, 2013.

Douglas, K. Richard. "Nurses & Biomeds A Winning Team for Positive Outcomes." TechNation Mag., 7, 44-47. January 2016. Web 03 January 2016.

"Did You Know?" *Literacy Project Foundation,* http://literacyprojectfoundation.org/ Web. Accessed 10 March 2016.

Ede, Lisa and Andrea Lunsford. "Audience Addressed/Audience Invoked: The Role of Audience in Composition Theory and Pedagogy." *College Composition and Communication.* 35.2 (1984): 155-171. *JSTOR*. Web. 30 January 2015.

Gerber, Ben S., et. al. "Implementation and Evaluation of a Low-Literacy Diabetes Education Computer Multimedia Application." *Diabetes Care* 28.7 (2005): 1574-1580. *Academic Search Premier (EBSCO).* Web. 16 March 2013.

Han, Jeong Yeob et al. "Application of the Comprehensive Model of Information Seeking." *Journal of Computer-Mediated* Communication. 15.3 (2010):367-388. *Wiley Online Library.* Web. 27 March 2013.

Hawkins, Robert P. Matthew Kreuter, Kenneth Resnicow, Martin Fishbein and Arie Dijkstra. "Understanding Tailoring in Communicating About Health." *Health Education Research.* 23.3 (2008): 454-466. *HighWire Press*. Web. 20 December 2014.

Hayhurst, Chris. "Hello, Partner How Working with Nurses Makes for Better Healthcare Technology." *Biomedical Instrumentation & Technology.* 49.1 (2015): 14-22. *AAMI Publications*. Web. 17 June 2015.

Hesse, Bradford W. and Kia LaTrece Davis. "Extending the Reach, Effectiveness, and Efficacy of Communication: Evidence from the Centers of Excellence in Cancer Communication Research (Editorial)." *Patient Education and Counseling*. 81.Supplement1 (2010): S1-S5. *Science Direct*. Web. 29 May 2015.

Jensen, Jakob D., Andy J. King, Nick Carcioppolo and LaShara Davis. "Why are Tailored Messages More Effective? A Multiple Mediation Analysis of a Breast

Cancer Screening Intervention." *Journal of Communication.* 62.5 (2012): 851-868. *EBSCO.* Web. 27 Jan. 2016.

Jerant, Anthony, Nancy Sohler, Keven Fiscella, Becca Franks, and Peter Franks. "Tailored Interactive Media Computer Programs to Reduce Health Disparities: Opportunities and Challenges." *Patient Education and Counseling.* 85.2 (2010): 323-330. *Academic Search Premier (EBSCO)*. Web. 09 March 2013.

Kreps, Gary. "Translating Health Communication Research Into Practice: The Importance of Implementing and Sustaining Evidence-Based Health Communication Interventions." *Atlantic Journal of Communication*. 20.1 (2012): 5-15. *EBSCO*. Web. 12 May 2016.

McIntosh, Paul. *Action Research and Reflective Practice.* New York, NY: Routledge, 2010. Print.

Mills, Geoffrey E. and Robert Butroyd. *Action Research A Guide for the Teacher Researcher.* Harlow, England: Pearson Education Ltd, 2014. Print.

Morschauser, Michael. "Improving Patient Safety Through Collaboration Between Clinical Staff and Engineering Staff in Hospitals." *Journal of Clinical Engineering.* 39.3 (2014): 129-131. Web. 01 June 2015.

Noar, Seth M., Nancy Grant Harrington, Stephanie K. Van Stee and Rosalie Shemanski Aldrich. "Tailored Health Communication to Change Lifestyle Behaviors." *American Journal of Lifestyle Medicine.* 5.2 (2011): 112-122. *SAGE* Journals. Web. 20 December 2014.

Rimer, Barbara K. and Matthew W. Kreuter. "Advancing Tailored Health Communication: A Persuasion and Messages Effects." *Journal of*

Communication. 56.S1 (2006): S184-S201. *Communication & Mass Media Complete (EBSCO).* Web. 20 December 2014.

Sagor, Richard. "The Action Research Guidebook." Eds. A. Burvikos and D. Bartlett. Thousand Oaks, CA: Corwin. 2011, vii-xiv.

"Technical Communication in Healthcare Professions." *School of Engineering and Technology*. IUPUI, http://www.engr.iupui.edu/departments/tlc/courses/tcm/38000.php. Accessed 24 Oct. 2016.

Turow, Joseph. "Segmenting, Signalling and Tailoring: Probing the Dark Side of Target Marketing." *Critical Studies in Media Commercialism.* Ed. R. Anderson and K. Strate, New York: Oxford University Press, 2000, 239-249.

Volk, Robert J. et al. "Entertainment Education for Prostate Cancer Screening: A Randomized Trial Among Primary Care Patients with Low Health Literacy." *Patient Education and Counseling.* 73.3 (2008): 482-489. *ScienceDirect Journals.* Web. 27 March 2013.

"What is Healthcare Engineering Technology Management?" *School of Engineering and Technology*. IUPUI, http://www.engr.iupui.edu/departments/ent/undergrad/hetm/index.php. Accessed 8 April 2016.

Curriculum Vitae

Mary Frances Baechle

Education

1982	B.S., Environmental Systems Northern Illinois University: DeKalb, Illinois
2000	B.S., Business Computer Information Systems, St. Cloud State University: St. Cloud, Minnesota
2005	Instructional Systems Technology Certificate Indiana University: Bloomington, Indiana
2010	M.A., Journalism-Public Relations, Indiana University Indiana University-Purdue University Indianapolis
2013	Teaching Writing Certificate, Indiana University Indiana University-Purdue University Indianapolis
2016	M.A., English, Indiana University Indiana University-Purdue University Indianapolis

Professional Experience

2014-	Lecturer, Technical Communication Technology Leadership and Communication School of Engineering, Purdue University Indianapolis, IN
2013-2014	Public Affairs Consultant McFarland PR and Public Affairs, Inc. Indianapolis, IN
2010-2013	Sr. Technical Writer Kinney Group Indianapolis, IN
2001-2002 2007-2009	Technical Writer Hurco Companies Indianapolis, IN
2001-2006 1987-1990	Technical Writer Eli Lilly and Companies Indianapolis, IN

2001-2001	Programming Associate The St. Paul Companies St. Paul, MN
1992-1996 1987-1990	Sr. Community Relations Consultant Jacobs Engineering Group, Inc. Chicago, IL
1991-1992	Technical Editor Illinois Office of Technology Transfer University of Illinois at Chicago Chicago, IL
1990-1991	Program Director Winnebago County Health Department Rockford, IL

Honors and Awards

2001	Beta Gamma Sigma Honors Society St. Cloud State University Chapter