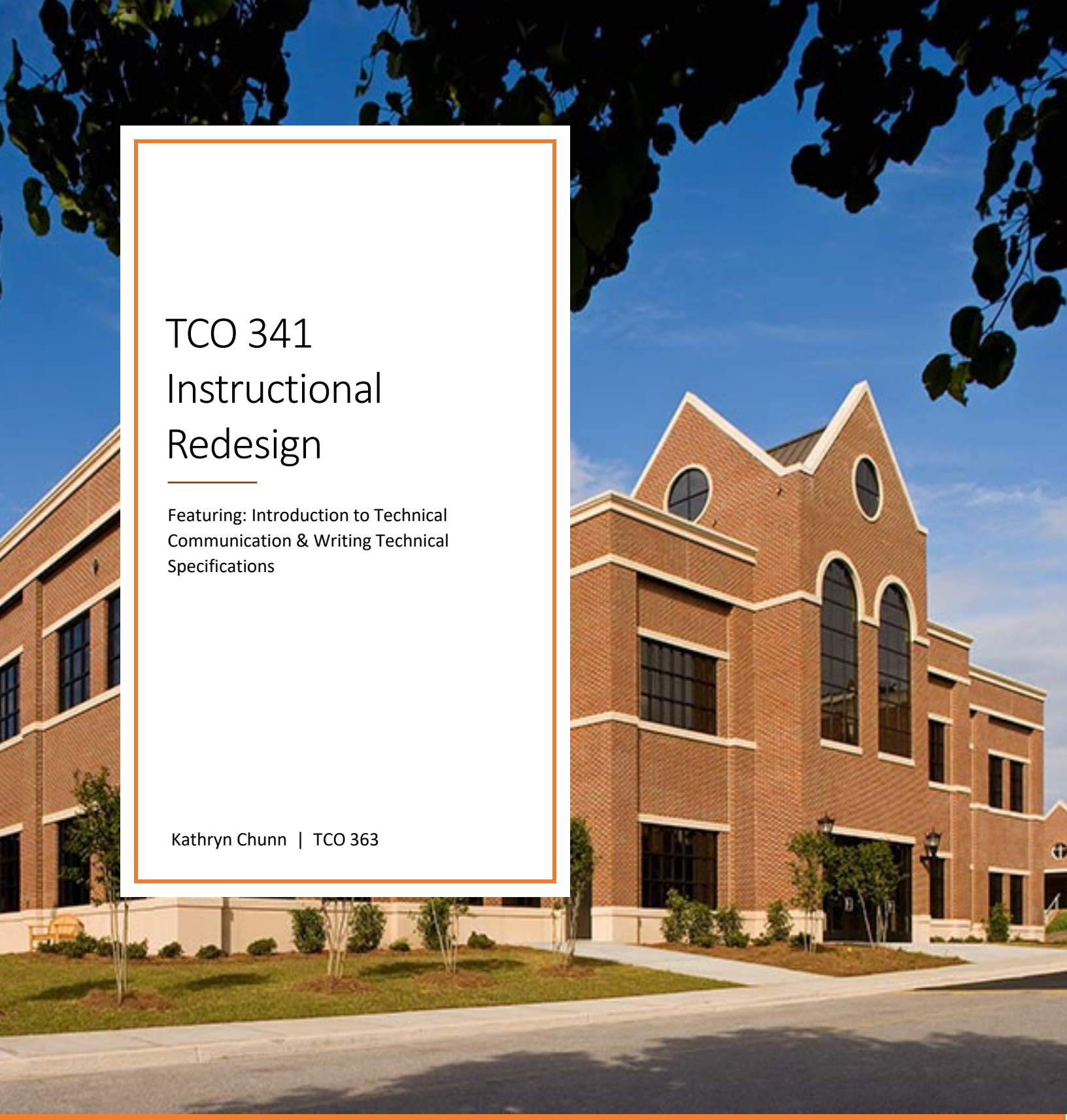

TCO 341 Instructional Redesign

Featuring: Introduction to Technical Communication & Writing Technical Specifications

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Background

Mercer University's Technical Communication Department is one of the only Technical Communication Departments in the United States. The courses offered give students an innovative entry into a Technical Communication field. The TCO 341 course is the introduction into the Technical Communication field and creates a base for Technical Communication Majors, Minors, and other interested parties to continue their studies in Technical Communication. The course is based off of Engineering texts, student review through the senior design course, Mercer University's course standards, and the professors' own experiences. Due to the vast amount of input to this course, it is unstable, students in different sections have different experiences. This instability has shown that the out of class work is where students have the most trouble. Mercer University requires a large amount of supplemental out-of-class instruction to take place per course, and for TCO 341 most of the out-of-class instruction is readings in the textbook. The content in the textbook is very informative but the delivery of the information as a reading does not keep students engaged. The result of this is students not doing the required readings before class. In a hope to solve this problem, the Technical Communication Department recruited the Instructional Design class to redesign the textbook delivery.

Purpose

The purpose of this project is to redesign the delivery of the textbook. Information acquired from the SME's and past student experiences has noted that the textbook is not an effective device for out of class learning as determined in the Needs Assessment.

Needs Assessment

As one of the only Technical Communication Departments in an Engineering School in the United States, the Mercer Technical Communication department is constantly improving their courses to prepare students to enter the professional field. Part of this preparation is the Technical Communication 341 course. The purpose of the Technical Communication 341 course is to instill the basics of technical communication in students. The students who take the course are a variety of Technical Communication and Engineering Majors and Minors and interested parties. Depending on the number of enrolled students in the course, there are generally 4-5 separate sections taught by a variety of professors each semester. While all of the content is the same there are differences in how the content is delivered. The students and professors have requested a newer standardized model of delivery for homework to add stability to the course.

Course Analysis

The large variety of students in the course results in a motivation or attitude gap. Some of the students, like the majors and minors, are very interested in the material and, therefore, work harder to learn the material. Other students are required to take it as it is a mandatory course in the engineering core curriculum and therefore are not motivated to learn the materials. This motivation gap contributes to the knowledge gap as students are not preparing for class. If the students are uninterested, they are not going to try very hard to complete their readings and out of class assignments.

The textbook has served the course well, however students are not engaging in the textbook resulting in a knowledge gap. The professors have indicated that students have different levels of learning as a result of students not reading the textbook before class, therefore, professors must do reviews or catch ups to get everyone on the same level before real class activities can begin. This wastes the time of the students who did read, and the professors time in class. Most of the delivery for homework in Technical Communication is very static, while it should be more interactive to keep students engaged in their coursework and motivated to complete their out of class work.

Module Analysis

For the module on Technical Communication, most students have a basis of Technical Communication from taking the TCO 141 course but there are still gaps in their learning as illustrated below:

Current	Ideal	Gap(s)
Knowledge of what Technical Communication is.	Knowledge on how to apply Technical Communication to their workforce.	Knowledge and understanding
Limited skills in Technical Writing.	Proficiency in Technical Writing.	Skill
Limited knowledge of Technical Communication skills.	Knowledge of Technical Communication skills and how to apply them.	Knowledge and Skill
No passion for Technical Communication due to a lack of understanding of how Technical Communication can better their careers.	Passion or at least interest in Technical Communication.	Motivation Gap and Knowledge Gap

For the module on Design Specification, most students may have a basis of knowledge from their Engineering core classes and projects completed in those courses but there are still gaps in their learning as illustrated below:

Current	Ideal	Gap(s)
Limited knowledge on what Design Specifications is.	Knowledge of what Design Specifications are and the skills needed to write Design Specifications.	Knowledge, Skills
Student proposals lacking necessary components to fully comprehend the assignment and what is required of them.	Understanding what Design Specifications are and how they fit into their proposals and resulting assignments.	Knowledge

Solution

To solve the knowledge gap, professors request for a redesign of the delivery of course materials, particularly homework and readings. The redesign must:

1. Engage students in the material.
2. Work in tandem with the textbook.
3. Have a cohesive design across all modules.

4. Define a ground level of understanding before the students arrive to class.

Recommendation

To achieve the goals of the redesign, I recommend interactive multimedia modules that reflect the concepts learned in the textbook to capture the attention of students and solve the needs of the professors.

Learner Analysis

In order to properly design instruction and solve the needs of our learners, we have to analyze the learners' demographics, educational background, work experience, skills, motivations, and characteristics.

Demographics

Almost all of the learners are traditional students, meaning they are between 18-22 years old. According to data collected on the student body by collegefactual.com the student population at Mercer is mostly white females, with black or African American females with the next highest population.

Educational background

All of the learners have graduated high school and received scores high enough on their ACT or SAT to gain admission to Mercer University. The nontraditional students have a variety of educational backgrounds, sometimes including college credits or college graduation, or even higher education.

Work experience

It is difficult to determine the level of work experience of the learners but most of the traditional learners will have little to no career experience. They may have skills learned in noncareer jobs that are applicable to the course though. The nontraditional students would most likely have some career work experience or applicable skills.

Skills

The learners come to the TCO 341 course already equipped with around 1-3 years of Mercer courses, along with 12 years of K-12 Education, and they bring with them the skills learned in those courses. All of the learners have taken the prerequisite TCO 141 course which gives them a basic introduction to Technical Communication and some of the skills needed to orient them to the course. Some of the skills the learners will come in with are:

- Interpersonal skills
- Oral Communication
- Basic Writing Skills
- Basic Math Skills
- Research Skills
- Citation Skills
- Basic Design/Formatting Skills learned from TCO 141

    - Headings/Visual Hierarchy
    - Page Numbers
- Reading Skills

The learners may also come equipped with skills learned through working, volunteering, or interning that may be applicable to TCO 341 concepts like organization or management skills.

Motivations

The learners have a variety of motivations for taking the course, some of which are listed below:

- Technical Communication Majors: Motivated internally by the desire to learn more about Technical Communication and to eventually make a career out of Technical Communication.
- Technical Communication Minors: Motivated internally by the desire to learn more about Technical Communication and to eventually involve or integrate Technical Communication skills into their career field.
- Technical Communication Minors: Motivated externally by their advisors to minor in Technical Communication.
- Engineering Students: motivated externally by the engineering curriculum which requires Technical Communication as part of its core.
- Other/Elective: Motivated internally because they are interested in the course material.

Conclusions

In order to adapt the learning to the learner I plan to design for the unexpected or the outliers. What I mean by this is setting a foundation for each module that would be easy for the lowest level of learners. In the Introduction to Tech Comm module this looks like flash cards that define must know terms at the beginning and a very broad introduction of the subject that all learners will understand. In the Writing Design Specifications module this looks like a review of the writing process. Understanding our learners helps understand the contexts for learning which is needed to properly design instruction.

Context Analysis

The context of the TCO 341 class and our subsequent modules can be defined using orienting, instructional, and transfer contexts which will define the physical environment and situation.

Orienting Context

Most of the learners have a baseline of knowledge about Technical Communication because they would have taken the TCO 141 course. The TCO 141 course defines some of the really broad concepts in Technical Communication and skills you need to succeed in Technical Communication, like grammar and writing knowledge, and some basic communication skills. All of the learners entering TCO 341 are required to take the course as part of the engineering curriculum, unless they are optionally taking it outside of the engineering curriculum like minors. The attitudes of the learners are illustrated on the next page:

Situation/Context	Attitude
Required to be there as a part of the Engineering Curriculum	disinterested or negative attitude
Majoring in Technical Communication or thinking of majoring	interested or positive attitude
Minoring in Technical Communication or thinking of minoring	interested or positive attitude

Instructional Context

The in-person learning takes place in a university classroom, while online learning takes place over zoom and in personal rooms. Homework or supplemental learning takes place in personal rooms and utilizes canvas and textbooks. All students have access to computers, whether personal laptops or public computers in the library on campus for out of class learning. All university classrooms have a projector and laptop connectivity along with desks, chairs, and whiteboards. The temperature and lighting in the classrooms are up to the professor teaching and usually aren't set to anything particular.

Online learning can take place wherever the student is so it is hard to predict the physical environment the student will encounter if learning is online. Online learning is made possible by Zoom and Canvas, the LMS that Mercer University uses. In Canvas instructors can record and post lectures using Echo 360, post assignments, and structure learning modules. The learning modules have limited capacities and hold mostly textual information or attachments. Some instructors have used the Canvas modules to teach the course in the past but the lack of interactivity doesn't keep the students engaged in the instruction.

Transfer Context

The details learned in TCO 341 can be used throughout the learners' classes and in their future careers, making the transfer context broad. The information could be put into practice anywhere. Technical Communication uses a lot of computer technology so the learners need to be fluent with computer software's and will be using computers in their future career field if going into engineering or technical communication. Learners must also have communication skills to navigate their workplace. Engineering majors can transfer the knowledge learned to their Senior Design project where they must organize, manage, and present a design project. The professional skills needed to be successful in the Senior Design course are learned in TCO 341.

Similarities and Conclusions

Based on the contexts, learning of the homework modules will mostly happen independently on computers in the learners' personal rooms. Computer access is essential to learning and understanding of the computer is crucial to the transfer context. To appropriately instruct the students I recommend more immersive online modules that help students develop transferable skills.

Content Analysis

The content of the modules is outlined in this section and is based on the textbook and other important topics that relate to the chapters. By adding in information outside the textbook, like career relevant information, I can prepare the students for the transfer of instruction to the workforce as we found in the context analysis.

Intro to Technical Communication

1. What is Technical Communication?
    a. Definition: listening, speaking, reading, and writing
2. Technical Communication Vocabulary
    a. Deliverable: something you produce for your client
    b. Tech Comm not TCO
    c. Content
    d. Design
    e. Context
    f. Feedback
    g. Message
    h. Communication
    i. Genres/Modes/Formats
3. Overview of Audience and Purpose
4. Tech Comm Skills in the Workplace
    a. Jobs you can get with Technical Communication skills
    b. Applicable skills you can use:
        i. Communication
        ii. Collaboration
        iii. Interpersonal Skills
        iv. Plan, Organize, and Prioritize Work
        v. Analyze Information
        vi. Create/Edit Written Reports
        vii. Grammar
        viii. Professional Writing Style
        ix. Research
5. Things you can produce with Technical Communication
    a. Technical Writing: Proposals
    b. Communications: Emails, Resumes, Memos
    c. Instructional Design: Training
    d. Information Design: Pamphlets, Newsletters
    e. Web Design: Websites, Blogs
    f. User Experience Analysis
6. Introduction to Technical Writing
    a. Brief overview of Writing process
        i. Planning
        ii. Drafting

iii. Revising
iv. Editing
v. Proofreading

Writing Design Specifications

1. What are Design Specifications?
    a. Definition: Document describing or identifying something precisely or stating a precise requirement
2. Types of Specifications
    a. Functional Specifications
    b. Performance Specifications
    c. Technical Specifications
3. Review of Technical Writing process
    a. How to label figures
    b. Planning, Drafting, Revising, Editing, Proofreading
4. Writing Definitions
    a. Contextual Example
    b. Writing sentence definitions
    c. Writing extended definitions
5. Writing Descriptions
    a. Contextual Example
    b. Drafting descriptions
6. Writing Design Specifications
    a. Clarity
    b. Accuracy
    c. Repetition
    d. Logic

Learning Objectives

Learning objectives are important because they provide a framework for designing instruction appropriate to the content. They also provide a way to evaluate if the learners learned from the instruction. The way learning objectives are formatted is also very important because the learning objectives must be measurable using a condition, a "who", an action, and some sort of criteria. By following this formula, the learning objectives are clear, concise, and help the students develop a fuller understand or the instruction.

Lesson 1: Introduction to Technical Communication

After completing this lesson, students will be able to do the following:

1. Define Technical Communication including all four parts of the main communications used in Technical Communication.
2. Articulate vocabulary used in Technical Communication with complete accuracy.
3. Summarize what audience and purpose are with at least 80% accuracy.
4. Express how Technical Communication skills are applicable in the workplace by:

    a. Listing at least 5 skills.
    b. Listing 3 jobs you can get with Technical Communication skills.
    c. Discussing how the applicable skills better the workplace and why they are needed.
5. Identify at least 5 deliverables you can produce with Technical Communication.
6. Summarize the technical writing process with complete accuracy.

At the end of the lesson, students will demonstrate their learning of the above objectives by passing a review quiz with at least an 85%.

Lesson 2: Writing Design Specifications

After completing this lesson, students will be able to do the following:

1. Define design specifications including the following words: describing/identifying and precise/precisely.
2. Articulate the types of specifications by giving examples for each of the three types.
3. Demonstrate how to label figures with complete accuracy.
4. Describe the difference between sentence and extended definitions and how to write each with complete accuracy.
5. Demonstrate how to write descriptions by appropriately writing a description with complete accuracy.
6. Describe the importance of Clarity, Accuracy, Repetition, and Logic in writing design specifications with complete accuracy.

At the end of the lesson, students will demonstrate their learning of the above objectives by passing a review quiz with at least an 85%.

Learning Strategies

Every piece of instruction/education has to consider learning strategies. Learning strategies are the theories and techniques used to help students understand a new set of skills or information. Some examples of learning strategies are constructivism and cognitivism. Learning strategies are especially important when designing instruction for adult learners because adult learners have more life experience than other learners and need instruction that supports them.

Designers can use learning strategies to structure instruction and shape it for the learners. I believe constructivism is the best learning strategy for adult learners especially for online instruction. We are building off of what the learners know already to bridge the knowledge and skill gaps. This can look like interactive modules with quizzing that has a definitive hierarchy so the learning builds on itself. Review questions and real-world scenarios would help integrate past knowledge and skills with the new knowledge and skills in the instruction.

Intro to Technical Communication

The Introduction to Technical Communication module will set the foundation of the cumulative learning modules. Below are the strategies I employed to develop the module:

- **Pre-Instructional Strategy:** To reel in the learners and gain their interests in technical communication, I plan to display a quote about how much technical communicators can make in a year. Students are all about money and seeing results, so seeing the possible money they could earn will motivate and interest them to engage in learning.
- **Initial Presentation Strategy:** For the online instruction I plan to utilize a combination of text, videos, and graphics along with interactive elements, like tab over slide shows and matching and sorting games.
- **Generative Strategy:** In order to asses that the learners actually learned and filled their gaps, a review post quiz will be offered at the end of the module. The quiz will have feedback to help the learners if they get the questions wrong.

Writing Design Specifications

The Writing Design Specifications module will help students develop the knowledge and skills needed to begin writing their project proposals. Below are the strategies I employed to develop the module:

- **Pre-Instructional Strategy:** Proposal writing and writing processes can be incredibly boring so to start off the instruction, I plan to display a meme on the writing process. I think it is always good to start off with a laugh and will show learners that writing can be fun.
- **Initial Presentation Strategy:** For the online instruction I plan to utilize a combination of text, videos, and graphics along with interactive elements, like tab over slide shows and game like quizzing. Graphics and interactive graphics will be utilized heavily in this module along with activities and prompts for students to optionally practice their writing.
- **Generative Strategy:** In order to asses that the learners actually learned and filled their gaps, a review post quiz will be offered at the end of the module. The quiz will have feedback to help the learners if they get the questions wrong.

Instructional Materials

For my lessons I will use multiple types of media. In order to keep the students engaged, I plan to change delivery mode every couple of minutes. By doing this the materials will also be broken up in easily digestible “chunks”.

Intro to Technical Communication

Listed below are the heading and the instructional materials for each section. To start the module a quote will be shown with statistics on how much a technical communicator makes.

1. What is Technical Communication
    a. Text: Definition
    b. Graphic/Visual: Technical Communication Word Cloud
2. Technical Communication Vocabulary
    a. Interactive Element: Flash cards that flip over when clicked with definitions and terms
3. Overview of Audience and Purpose
    a. Interactive Element: Flip through slide show
        i. Slide 1: Overview/Intro

1. Graphic
2. Text: Introduction to audience and purpose

ii. Slide 2: Audience
1. Graphic
2. Text: Audience lesson

iii. Slide 3: Purpose
1. Text: Purpose lesson

b. Interactive Element: Matching game, match the definition to the term for audience and purpose

4. Tech Comm Skills in the Workplace
   a. Text: Introduction
   b. List: Skills
   c. Video: Meet a Technical Communicator
   d. Interactive Element: Click through Tabs with Technical Communication Jobs
      i. Graphic: for each job on each tab
      ii. Text: about that job and its pay
5. Things you can produce with Technical Communication
   a. Interactive Element: Flip through slide show
      i. Slide 1: Technical Writing
         1. Graphic: Proposal
         2. Text: What technical writing entails
      ii. Slide 2: Communications
         1. Graphic: Email/Memo
         2. Text: What communications entails and what it can be
      iii. Slide 3: Instructional Design
         1. Graphic: "THIS"
         2. Text: What instructional design entails
      iv. Slide 4: Information Design
         1. Graphic: Newsletter
         2. Text: What information design entails
      v. Slide 5: Web Design
         1. Graphic: Website
         2. Text: What web design entails
      vi. Slide 6: User Experience Analysis
         1. Visual: Picture of a usability testing
         2. Text: What UX entails
   b. Interactive Element: Sorting game, sort the item into the appropriate category- Deliverable, Jobs, Skills
6. Introduction to Technical Writing
   a. Text: Intro about the writing process
   b. Graphic: Writing process graphic
7. Review Quiz
   a. Interactive questions: matching, multiple choice, and fill in the blank

Writing Design Specifications

Listed below are the heading and the instructional materials for each section. To start the module a meme will be shown to add an entertaining element to a usually boring topic.

1. What are Design Specifications
    a. Text: Definition
2. Types of Specifications
    a. Interactive Element: click through tabs with each type of specification on each tab
        i. Text: Type of specification and what it is
        ii. Graphic/Visual: Visual example of that specification
    b. Interactive Element: Matching game where you match the specification to the definition
3. Review of Technical Writing Process
    a. Graphic: Technical Writing Process
    b. Text: Where do you put labels on figures?
    c. Graphic: Figure with label circled
    d. Interactive Element: Multiple Choice question on where the label goes on a figure
    e. Interactive Element: The writing process in a click through presentation
        i. Slide 1: Planning
            1. Graphic: Writing process graphic with planning emphasized
            2. Text: Explain what is involved in this step
        ii. Slide 2: Drafting
            1. Graphic: Writing process graphic with drafting emphasized
            2. Text: Explain what is involved in this step
        iii. Slide 3: Revising
            1. Graphic: Writing process graphic with revising emphasized
            2. Text: Explain what is involved in this step
        iv. Slide 4: Editing
            1. Graphic: Writing process graphic with editing emphasized
            2. Text: Explain what is involved in this step
        v. Slide 5: Proofreading
            1. Graphic: Writing process graphic with proofreading emphasized
            2. Text: Explain what is involved in this step
    f. Interactive Element: Matching the step with the process label
4. Writing Definitions
    a. Graphic: Contextual example
    b. Interactive Element: Tab over slides
        i. Tab 1 Text: How to write sentence definitions
        ii. Tab 2 Text: How to write extended definitions
5. Writing Descriptions
    a. Graphic: Contextual example
    b. Text: How to draft descriptions
6. Writing Design Specifications
    a. List: The key aspects of design specs
    b. Text: How to write design specifications
7. Review quiz
    a. Interactive Element: matching, multiple choice, and fill in the blank questions

Evaluation Plan

Evaluation is an integral part of the ADDIE model, being that E stands for evaluation. Evaluating a program is necessary because it shows if the analyzed gaps were solved and the goals were met. If they were not met then further education/instruction is required, but without evaluation instructors would not know this. There are multiple methods to evaluate learners, two of which being a research-based approach and Kirpatrick's Model. For this program, I plan to evaluate my learners based on Kirpatrick's model.

Reaction

The first step to Kirpatrick's Model is Reaction, which assesses the learners' reactions to the training right after it has occurred. To do this I recommend implementing a survey the learner take after the fact, either in class the day after they do the module or at the end of the course over all of the modules, about how satisfied they felt with the training. An alternative to this is having the professor teaching the course to ask the students about their attitudes or reactions to the training at the beginning of each class. If the students are unhappy with a certain element of the training it can be adjusted for future audiences.

Comprehension

The second step to Kirpatrick's Model is Comprehension, which assess if the identified gaps were fulfilled. To do this I recommend a post-assessment or quiz to review the module and see if the students retained the knowledge. In my modules a review quiz is at the end of each module which asks questions about important topics. The quizzes are not set up to be difficult but to make sure the student understands enough to participate in group discussions and classroom activities. If the students don't pass the review quiz it prompts them to review the material they missed. I also recommend using a pre-existing class evaluation method, which is the final project, to determine if the students can transfer their knowledge into a real-world example. The final project typically includes the students writing a project proposal.

Transfer/ROI

The third step to Kirpatrick's Model is Transfer, which assess if the learners can transfer what they learned to everyday life or work. This step is typically assessed over a long period of time to see if the learners really absorbed the information and can apply it. Due to the fact that this step studies work/career transfer it is out of the scope of this project. We will be unable to access any material or data on this therefore we cannot evaluate based on transfer. Transfer of the material also may not happen for these skills because they are not immediately being transferred to the work place because most of our students are sophomores or juniors, and will not be entering the workforce for several years.

The fourth step is ROI or business results which tells if the implemented training impacted the organization's bottom line. Similarly to transfer, ROI is out of the scope of this project and we are unable to access the data and therefore cannot evaluate based on ROI.

Conclusion

In the analysis phase, it was discovered that there are problems with how the textbook and out-of-class instruction was delivered. Students and the SME's identified that the lack of engagement in the material is leading to students not completing their readings, and therefore not have a standard background in the information for lectures. During the development phase I came up with recommendations based on my analysis of the problem and the learners. My recommendation to solve the problems were to redesign the delivery of the textbook to include interactive modules that would standardize out-of-class instruction.

With the materials gathered in development, I moved into the design phase where I started thinking about how I was going to make the modules interactive. The redesign was based in Learning Strategies, particularly constructivism, which guided the structure of the modules along with the content. Constructivism is about building knowledge off of previously learned knowledge. To implement this strategy, I used a hierarchy of knowledge to create a foundation then building off of that foundation as the module progresses. To call to the learners experiences I included several scenarios that the learners could relate to based on my Learner Analysis.

I also came up with an implementation and evaluation plan for the instructors. The modules can be compiled and linked in Canvas and be used as a substitute to the traditional textbook.

Finally, I want to thank the Technical Communication department for allowing the Instructional Design students to complete this project. It was really positive experience where I learned a lot and gained life experience. No other class on campus can say they helped redesign an element of a Mercer University course. We are essentially helping with the shaping of future students and that is mind blowing.