Learner, Context, and Task Analysis

Learner Characteristics and Determination

General Characteristics

The learners that will enroll in this training come from a wide variety of backgrounds; however, they all will have two things in common: they are employed as lab technicians at City Community Hospital, and they all will have at least a Bachelor's degree in Biology. In order to determine specific characteristics, a survey would be conducted of the current employees. The survey would ask the following questions:

1. What is your gender?
2. What is your age?
3. What is your current title and position of employment?
4. How long have you been in this position?
5. How many credit hours have you taken specifically in microbiology?
6. How long ago were these taken?
7. What is your highest degree?
8. What is your ethnicity?

It is anticipated that there will be more females than males enrolled in the training; the age will range from students who have just finished college (21) to students in their 50s, the learners will come from a range of lab experience with some new to City Community Hospital and others having been employed there for years; many will have had minimal coursework in microbiology with some having taken their coursework decades ago; and most will be at the Bachelor's level.

Specific Entry Competencies

Since a Bachelor’s degree in Biology is a minimum requirement for employment as a lab technician at City Community Hospital, every learner will have had instruction on the characteristics of microorganisms and the meaning and importance of biological stains. They will also have had instruction on how to use the microscope. Since not all Biology degrees require a microbiology course, they may not have had formal instruction in laboratory and aseptic techniques. Every learner, however, has received on-the-job training in these techniques when they were hired. The survey used to determine general learner characteristics will determine the academic background of learners, and direct observation of the technicians in the laboratory setting will determine their overall skill level in
Learner Characteristics and Course Design

The learner characteristics will affect course design in several ways. Gender, age, and ethnicity will affect the selection of learning strategies and activities. Using examples relevant to the learners in training is important for learning to take place. Older learners may need some assistance using new and emerging eLearning technologies. The academic background of learners will also need to be taken into consideration. If most learners have never taken a microbiology course, more time will need to be spent on basic concepts before moving on to the techniques. If the learners already have this background, then the training can focus on the techniques themselves. If most technicians have earned their microbiology credits many years ago, a longer refresher will need to be included than if they have recently completed this education. Likewise, if the technicians have been on the job a long time, they may have some set in "bad habits" in the lab that will need to be addressed, such as misconceptions and misunderstandings about lab techniques. If the technicians are new or inexperienced, the training may have to focus more on basic techniques in the lab.

Learning styles were not measured because the instructional designer will design training to fit all learning preferences, using a variety of strategies and activities within the curriculum.

The Context

This training will be delivered in an eLearning environment, specifically, online. The learners will be given time during the workday to log in to the course website to complete training, with the option of working at home as well. Lab supervisors will serve as the instructors. Learners will be motivated to complete the training because it is mandatory for their next annual raise to be given.

Context and Course Design

Because the learners are all employees at City Community Hospital, and their focus is performing microbiological lab techniques on patient samples, the course should be designed with examples and activities specific to this environment. For example, lab activities should use organisms and specimens that the learners are likely to come across in their own lab, rather than plants or microorganisms that are rarely found in this country.

Other outside influences that will affect the design of the course need to be considered. For example, available technology should be considered. The instructional designer can work with programmers to use Flash and Java scripting to make the eLearning labs interactive, with the student manipulating virtual microscope knobs to focus, using the mouse to move the reagents and slides through the steps of a gram stain, and cultures can be virtually rotated and manipulated to determine if they are pure or not. In the near future, technologies such as haptic technologies will allow students to experience the psychomotor techniques using software and inexpensive equipment at home (Immersion Technologies, 2008).

In addition, since this training will be delivered via eLearning (using an online course design), the amount
of “space” that is needed on the City Community Hospital server and support software needs to be considered. The designer should avoid overloading bandwidth to avoid students' computers freezing while doing online labs and tests. The microbiology labs need to have appropriate graphic sizes in order to save available space, or students will need CD-ROMs with images mailed to their homes to supplement the website. As technology advances as mentioned above, City Community Hospital’s infrastructure may need to advance in order to use the technologies.

Finally, the instructors need to be considered. How savvy are the instructors with emerging technology? Will additional training need to be conducted so they can support their students as they enter this new virtual world? The instructors need to be up to speed in order for the students’ needs to be met.

**Task Analysis**

A task analysis will be conducted in order to determine the content needed in the training. This will include breaking down content that will be included in the lab skills unit into specific categories, such as concepts, principles and rules, procedures, interpersonal skills, and attitudes. Data will be gathered through interviews with the lab supervisors at both City Community Hospital and County Community Hospital, who will serve as the Subject Matter Experts. The majority of the content for this unit will be procedures, although concepts and principles will be necessary background knowledge for students to perform these procedures. Using the content determined in the needs and goals assessments, this task analysis would yield the following results for content structure:

**Concepts**

- How a microscope works
- Parts of a microscope
- Functions of each part of the microscope
- Categories of microorganisms (gram positive and negative; rods, cocci, and spirilli; etc.)
- Biological tests and their uses
- Aseptic technique
- Plating techniques
- Cultures- mixed and pure
- Colonies- how they form and what they represent

**Principles and rules**

- Aseptic technique
- Microscopy
- Interpreting biological tests
- When to use aseptic technique

**Procedures**

- Focusing a microscope
- Gram stain
Acid-fast stain
Endospore stain
Transfer to and from culture
Aseptic technique
Autoclaving

Each of these topics would then go through a topic analysis. The SME and instructional designer would go through each concept and principle or rule and create concept maps for each. These concept maps would then be used as a plan for instruction. In addition, a procedural analysis will be conducted. This will include making a flow chart for each procedure that the learner must be able to do, using interviews with the lab supervisors. For example, a flow chart for the gram stain procedure would be created so that the steps of the procedure are clearly broken down into parts the instructional designer can use. Using the data from these analyses, the designer can then move on to the next phase, this is designing instruction.