# Curriculum Matching

## Introduction

The goal of an instructor is to provide a credible and valid educational experience with curriculum matching as the hallmark of any sound education program. The three components of a sound educational program which must match include: learning objectives, the teaching content/methods, and the testing mechanism. If they do not match, the desired outcomes are unclear, the learning process becomes arbitrary, and the test is unfair and invalid. Only by aligning all three components of the curriculum can an instructor provide students with a credible, valid educational experience. The matching process begins by designing relevant objectives and planning lessons so that the course content and final exam match as closely as possible. The following document provides guidance for curriculum matching using a one-hour, online, on-demand tutorial on asthma as an example. This example can be readily adapted for other topics and delivery models. The Commission on Accreditation for Pre-Hospital Continuing Education (CAPCE) expects all applications for accreditation to employ curriculum matching techniques.

## Example Curriculum Matching

A typical curriculum contains three main components: the learning objectives (deciding your destination), teaching content and activities (the roadmap on how you will get where you want to go), and the testing mechanism (assessing whether or not you reached your destination.) Each of these three components has two basic rules, which we have provided under each component's sub-heading.

Learning Objectives. The use of learning objectives, also known as performance objectives, is crucial because they clearly state the desired outcome of instruction. They are the blueprint from which to design specific teaching strategies. The two basic rules for writing learning objectives are:

1. *Identify the subtopics of the lesson and write one objective for each sub-topic.* The number of objectives must be practical and achievable. For a one-hour class, three to five subtopics would be appropriate. For example:

| Subtopic | Objective |
|---|---|
| Anatomy and Physiology | Describe the anatomy and physiology of the respiratory system. |
| Pathophysiology | Describe the pathophysiology of an asthma attack. |
| Assessment | Explain the steps of assessing a patient in respiratory distress. |
| Field Management | Given a scenario, outline the appropriate field management of patients having mild to severe asthma attacks. |

2. *Learning objectives must clearly state what the participant should be able to do at the end of the session.* Performance terms are easily measureable and include action verbs such as: describe, explain, perform, state, demonstrate, perform, apply, and list. Avoid vague terms that are difficult to measure such as: know, appreciate, learn, understand, and be familiar. A student must understand what you will ask him to do in order to demonstrate what he has learned. The following examples illustrate this principle:

| Improperly Written Objectives | Properly Written Objectives |
|---|---|
| At the end of this lesson, the student will understand the anatomy of the upper airway. | At the end of this lesson, the student will be able to label the anatomical features of the upper airway on a diagram. |
| At the end of this lesson, the student will be familiar with the asthma triad. | At the end of this lesson, the student will identify and explain the components of the asthma triad. |
| At the end of this lesson, the student will learn how to manage an asthma attack in the field. | At the end of this lesson, the student will describe the correct field management of an asthma attack. |

Properly written learning objectives clearly identify how the student will demonstrate that she has achieved the stated objective and provide a solid foundation for designing the lesson and the testing mechanism. There must be enough objectives to match the subtopics and you should write them using measureable terms.[1]

<u>Teaching Content and Activities</u>. Designing the teaching content that will effectively bridge the gap between the objectives and the test is more art than science. The two basic rules of selecting teaching methods and activities are:

1. *Design all learning activities to inform and engage the student.* Designing learning activities that encourage students to become active participants, rather than passive watchers, is the key.[2] The internet gives access to an infinite number of materials and instructors are limited only by their imagination in finding just the right resource to help students learn. Using instinct and experience, instructors are encouraged to design learning activities that are dynamic and interactive. Always ensure that the content helps students achieve the stated objectives.

2. *Design the lesson to present information from simple to complex.* It is important to identify the appropriate sequence for presenting the material so that you build an escalating body of information in a way that is easy for students to understand. Using the asthma course as an example, first build a solid foundation of basic knowledge (e.g., epidemiology, anatomy and physiology of the airways.) Then describe the pathophysiology of an asthma attack with special emphasis on the anatomy and physiology of the normal airway. You would follow this with a discussion and demonstration of how the student should assess the respiratory system with a special emphasis on the pathophysiology of asthma. Finally, you would present the proper field management of an acute asthma attack with a special emphasis on the previously learned information. If the flow of information is logical and repetitive, student success rises.[3]

<u>Testing.</u> Robert F. Mager is a world renowned expert on the design and measurement of instructional objectives. In his book, *Measuring Instructional Objectives*, he writes, "You cannot find out if the objective is achieved unless you use items that ask the student to perform whatever the objective is about. If you use items that aren't right for an objective, not only will you not find out if your objective is achieved, you may fool yourself into thinking that it is. That's not bad when the objective isn't very important, but when it matters whether it is achieved, you run a risk by using poorly constructed or inappropriate items."[4]

The two basic rules for test writing are:

1. *Write at least three test items for every learning objective.* As stated earlier, students are not just "fair game" at test time. The testing mechanism and actual test items you select must match what you said the students would be required to do (learning objectives) and the actual lesson you presented. For a test to be valid, it must contain at least *three* test items *for each objective.*[5] In our example, the test must contain at least 12 multiple-choice items. For more information on writing a multiple choice test item, refer to Appendix G, Item Writing Standards.

2. *Design the questions according to the CAPCE standard.* Test validity also depends on the level of knowledge required by the learner to answer the questions correctly. The CAPCE standard (Appendix G) requires that no more than 25% of the questions be at the knowledge level. No more than 25% can be at the comprehension level, and at least 50% of the questions must be at the application level.[6] For our example, that means no more than three knowledge questions, no more than three comprehension questions, and at least six application questions.

The following examples of multiple-choice questions illustrate this principle.

Knowledge Level. At this level students are required to recall facts, figures, definitions, rules, and basic concepts. For example:

1. Asthma is a disease that directly affects which parts of the respiratory system?
2. Albuterol is a drug from which class?
3. The lung sound most often heard during an asthma attack is _____.

Comprehension Level. At this level, students are required to demonstrate an understanding of a concept or principle by recognizing a previously unseen example of it. For example:

1. What causes wheezing during an asthma attack?
2. What side effect might you see after administering albuterol?
3. How does cardiac asthma differ from regular asthma?

Application Level. At this level students are required to apply what they have learned to a new situation. For example:

1.  Your patient is experiencing severe respiratory distress. What position would be the most effective for him?
2.  Your asthmatic patient is refractory to nebulized bronchodilators. What would be the next prudent action to take?
3.  Your status asthmaticus patient just stopped breathing. What is your first priority?

The following chart could serve as a test blueprint for the sample class:

| Objective # | # Items | Knowledge | Comprehension | Application |
|---|---|---|---|---|
| 1 | 3 | 2 | 1 | |
| 2 | 3 | 1 | 2 | |
| 3 | 3 | | | 3 |
| 4 | 3 | | | 3 |

Becoming proficient at curriculum matching is essential for any instructor. This skill allows you to design educational programs that provide clear direction for what is to be learned, a base from which to design a lesson, and a valid mechanism for evaluating student success.

References:

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