Pearls for Writing Objectives DRAFT IN PROGRESS

Connie J. Mattera, M.S., R.N., EMT-P

I. **Curriculum planning begins with defining goals and objectives after completing a needs analysis**

A. Goals and objectives can take many forms and there are numerous acceptable instructional design methods to design and develop them

B. **What are Goals?** Goals are broad, generalized statements about what is to be learned. Think of them as a target to be reached.

1. In using a hierarchical approach goals are higher then objectives
2. Note that many statements described as objectives are actually framed as goals. That is because they list behaviors but do not describe the tactics of how to get there, i.e., HOW, WHEN, UNDER WHAT CIRCUMSTANCES they are to be accomplished or to what benchmark they are to be measured.
3. Simply stated, a goal says what behavior should occur and the objectives provide guidance in how to accomplish it.

C. **What are objectives?**

1. The standard established for medical education (including the EMS field) is to write objectives that measure changes in behavior therefore they are referred to as “behavioral objectives”
2. As you develop a course, a lesson, or a learning activity, you have to determine what you want the students to learn, do, or characterize in their behavior, and set forth how you will know that they have accomplished those goals. Learning objectives, also called behavioral objectives and instructional objectives, are a requirements for high quality course development.
3. Instructional objectives are specific, measurable, short-term, observable student behaviors. They indicate the desirable knowledge, skills, or attitudes to be gained.
4. Objectives are the foundation upon which to build lessons and assessments that prove the student has met the primary and secondary goals of instruction.
5. Think of objectives as tools to use to make sure you reach your goals.
6. The purpose of objectives is not to restrict spontaneity or constrain the vision of education in the discipline; but to ensure that learning is focused clearly enough that both students and teacher know what is going on, and so learning can be objectively measured.

D. **Questions to consider**

1. Who are the students or participants? EMTs? Paramedics? A mix of different practitioners with prior knowledge and experience?
2. Is this an entry-level or general education course or an offering intended for continuing education?

E. Specific learning objectives that clearly describe the expected outcomes serve several purposes

1. Define what the student is expected to accomplish or achieve.
2. Provide a link between expectations, teaching, and grading.

F. Stating clear course objectives is important because:

1. They become road maps in guiding selection of class content, designing learning activities, and in selecting resources for learning that chart a way to achieving the class goals.

2. Students will understand expectations. Objectives give direction and specify what will happen, under what conditions, and how well. They tend to dispel unrealistic learning activities and negative expectations. Everyone feels better when they expect to accomplish needed and agreed upon competencies.

3. Assessment and grading must be based on the objectives. In measuring performance, students are compared to the objectives, not to each other.

II. Domains of learning (Bloom)

A. Expected performance needs to be divided into one of three domains of learning: cognitive, affective, and psychomotor. Objectives for each use specific verbs and measure different forms of behavior and learning.

B. Cognitive

1. Those objectives concerned with the acquisition and application of knowledge, understanding, and intellectual skills such as problem solving, remembering, reasoning, concept formation, ability to see relationships, and understanding of principles, facts, ideas, or concepts.

2. Knowledge learning includes the recognition, comparison, correlation, integration, perhaps creation, and storage of all kinds of data or information. Other words that could be used include cognitive, intellectual, and understanding.

3. Example: Upon completion, the successful participant will correctly state from memory, three indications for unmedicated endotracheal intubation with 100% accuracy.

C. Affective

1. Those objectives concerned with personal value systems, social sensitivity, professional responsibilities, establishment of habits of conduct, changes in interests, attitudes, feelings, emotions, and values.

2. Example: Upon completion, the successful participant will consistently value and defend a competent adult's decision who has end stage COPD to refuse endotracheal intubation at such time as they progress to ventilatory failure.

D. Psychomotor

1. Those objectives concerned with developing specific motor abilities and general adaptive abilities that may be mental or motor with consideration given to the degree of skill desired as related to the level of experience.

2. Used to measure manipulation skills and coordination.

3. Skill learning involves the notion of repetition, practice, or habit. It includes all procedures, operations, activities, methods, and techniques involving performance of skills.

4. Skill competency measures the method or technique while knowledge is the supporting data.

5. Example: Upon completion, the successful participant will independently assemble and prepare the equipment needed to perform a safe endotracheal intubation from an airway bag commonly used by EMS services in 100% compliance with the program procedure manual.

III. Objective form - The A.B.C.D. method

A. Excellent starting point for writing objectives (Heinich, et al., 1996).

B. **Audience** –Who is the learner? The stem of the objective should identify "WHO" is supposed to accomplish the task or demonstrate the knowledge.

C. **Behavior** – **Define the behavior to be measured**

1. What will the student be able to do at the end of instruction? Describe what the learner is to do, not what the instructor is to teach. Focus on the results to be achieved and not the process used to reach the results.
2. This should be an overt, observable behavior, even if the actual behavior is covert or mental in nature. If you can't see it, hear it, touch it, taste it, or smell it, you can't be sure your audience really learned it.
3. The behavior must be specific and measurable (observable). Limit objectives to those that are realistic and achievable for the situation. Use an action verb that is subject to few interpretations and clearly states the desired outcome.
4. Include only one behavior per objective so it is possible to judge each behavior separately.
5. Never use words such as know, learn, be familiar with, etc. How can those terms be measured? What must a student do the prove it?

D. **Condition** – When and under what circumstances or context will the behavior be expected to occur? What will the student be given or already be expected to know to accomplish the learning? Warn of any restrictions, e.g., “Given the respiratory, circulatory, and neurologic parameters, participants will accurately calculate a revised trauma score using the Trauma Score specifications table.”

E. **Degree** – What are the criteria for acceptable performance? To what benchmark or degree of excellence must the behavior be accomplished? This will be stated differently depending on the domain of learning to be measured. In class, passing scores frequently define the degree. Does the behavior require total mastery (100% of the time), or must they respond correctly 80% of the time? In psychomotor skill evaluation a good benchmark may be “without critical error”.

F. Another excellent way to remember the components of a good objective is the SMART mnemonic. Objectives must be

1. Specific
2. Measurable
3. Attainable
4. Realistic
5. Timely

G. **Formatting:** The educator may consider placing audience, some conditions and the degree in the stem and only list the specific behaviors below it. Example: After reading the advance learning materials and completing class, each participant will independently do the following with a degree of accuracy that meets or exceeds the standards established for their scope of practice:

1. compare and contrast…
2. perform the skill in correct sequence…
3. defend a patient’s right to…

IV. Achieving balance

A. In writing cognitive objectives, design a logical progression from knowledge and understanding to evaluation and create.

B. Test questions must be mapped or written based on the taxonomy of the objective, so use careful thought in their creation.

C. Objectives must be written for each segment of content and chronologically follow the flow of ideas.

D. It is important to carefully select the verbs to express the desired behavior you want students to achieve. Avoid the repetitious use of one verb, such as list, state, describe, or discuss.

V. Examples of objectives written in this format

A. **Color coding**
   1. **Audience (A) – Red**
   2. **Behavior (B) Green**
   3. **Condition (C) - Blue**
   4. **Degree of mastery (D) – Gray**

B. **Example #1: Cognitive objective (knowledge level)**
   1. **(C) At the completion of this lesson, given a chart of human anatomy,**
   2. **(A) the EMT student**
   3. **(B) will accurately identify the major bones of the body**
   4. **(D) at least 80% of the time.**

C. **Example #2 Cognitive objective (comprehension level)**
   1. **(C) Upon completion of the class, given a patient's history and a list of signs and symptoms,**
   2. **(A) the participant**
   3. **(B) will accurately identify the illness or injury**
   4. **(D) at least 80% of the time.**

D. **Example #3: Cognitive objective (problem solving/synthesis level)**
   1. **(C) Upon completion of this lesson,**
   2. **(A) the EMT student**
   3. **(B) will differentiate the clinical implications of a strong, weak, regular, and irregular pulse**
   4. **(D) at least 95% of the time.**

E. **Psychomotor objectives**
   1. **Example #1: (Precision level)**
      a. **(C) Upon completion of this lab,**
      b. **(A) the EMT student**
      c. **(B) will demonstrate correct lifting and moving techniques to prevent back injuries**
      d. **(C) without use of the skill sheets**
      e. **(D) 100% of the time.**
   2. **Example #2**
      a. **(C) At the completion of this lesson, using a ridge splint,**
      b. **(A) the EMT student**
      c. **(B) will stabilize a suspected fracture of the tibia**
      d. **(C) on a moulaged victim**
      e. **(D) without critical error.**

F. **Affective objective**
   1. **(C) Upon completion of this module,**
   2. **(A) the EMT student**
   3. **(B) will value and defend the need for obtaining complete and accurate**

vital signs on every patient

4. **(D) 100% of the time.**

G. **Can you find the A, B, C, and Ds?**

1. Upon completion, the successful participant will

   a. correctly state from memory four contraindications for the administration of oxygen with at least 75% accuracy.

   b. select the correct device from an assortment of sizes and safely insert an oropharyngeal airway into a manikin in compliance with the program procedure manual without critical error.

   c. defend a decisional adult's choice with end stage COPD to refuse endotracheal intubation even if they are in ventilatory failure, 100% of the time.

H. Typical Problems Encountered When Writing Objectives

Problems	Errors	Solutions
Too wordy/complex	The objective is too broad in scope, combines too many behaviors or is actually more than one objective.	Use the ABCD method to include each element and edit out unnecessary words. Divide into more than one objective if needed.
No observable behavior to measure	Using verbs like comprehend or understand make it difficult to measure achievement of the objective.	Consult lists of verbs from the variety of taxonomies presented in educational resources and determine exactly what you want the student to be able to know, do, or value.
Incomplete or only lower level objectives specified	Objectives often written as goals as they omit one or more of the elements (notably conditions and degrees) or they do not differentiate behaviors in ascending mastery based on the levels in the learning domains.	Thoughtfully determine the levels at which the student or participant must perform and write objectives to those levels including each of the A, B, C, D elements.

I. Tying Objectives to Assessment

BLOOM'S TAXONOMY OF COGNITIVE OBJECTIVES		
Level of learning	**Associated Verbs**	**Examples of general objectives**
1. **Knowledge:** Involves the rather elementary skill of recalling or remembering **specific factual material or experiences.** The information recalled may include concepts, terminology, or facts. A higher level of knowledge involves knowing the ways or means of dealing with information. This includes conventions, as well as trends and sequences, classifications and categories, criteria, and methodology.	Select, describe, define, discuss, identify, list, name, recall, recognize, select, state	Upon completion, the successful participant will 1. define the term "trauma". 2. recognize the behavior of trauma patients when pain management is insufficient. 3. label the topography of the circulatory system. 4. calculate a pulse pressure given a systolic and diastolic blood pressure reading.
2. **Comprehension**: Involves understanding or perceiving the meaning of a fact. It includes taking in, grasping, or insight, and, is highly stressed in formal learning programs. In many ways, comprehension necessitates the processing of information which may include changing it into some parallel form more meaningful to the learner without relating it to other ideas or material or seeing its fullest meaning. Three subcategories of comprehension are recognized: • **Translation**: Changing something into another form. • **Interpretation:** Elucidating or clarifying the meaning. • **Extrapolation:** Projecting, extending, or expanding known data or experience into an area not known or experienced so as to arrive at a conjectural knowledge of the unknown area.	Transform, predict, interpolate, extrapolate, interpret, translate, illustrate, draw, re-arrange, re-order, explain, associate.	Upon completion the successful participant will 1. translate the following terms from Greek to English. 2. give two examples of Newton's First Law of Motion. 3. draw a graph illustrating the relationship between FiO_2 and pO_2. 4. interpret the following situation... 5. explain what is meant by compensated vs. uncompensated shock.
3. **Application**: Involves using information in a specific manner. As such it includes relevancy, as well as the capacity for close attention to detail. Diligence and effort are also involved. The two lower categories of knowledge and comprehension are prerequisites to application. Application involves an element of creativity, since it involves seeing how particular phenomena can be used in a new situation where there is no specific solution. The skill of application underlies a great part of formal learning and is intimately concerned with some of the primary objectives of education.	Plan, record, employ, use, revise, formulate, apply, show, demonstrate, investigate, perform, relate, develop, transfer, construct, infer.	Upon completion, the successful participant will 1. apply the principle of Starling's Law to describe the effect of increased preload on cardiac output. 2. relate the implications of disruptions to osmosis, diffusion, and active transport to cell dysfunction. 3. transfer the concept of deceleration forces from laws of physics to human injury potential.
4. **Analysis:** Involves understanding the organizational structure of an idea by breaking down or the separation of a whole into its component parts. It is a process of reasoning or thinking. In its simplest form, analysis includes a simple listing of elements. A higher level of analysis involves determining the nature of the relationship between these elements. The highest form of analysis includes identifying the organizing principle or principles behind the actual material or phenomena concerned. At this level, analysis begins to take on many of the features of synthesis.	Analyze, separate, break down, discriminate, distinguish, detect, categorize, compare, contrast, diagram, differentiate	Upon completion, the successful participant will 1. categorize the four classifications of hemorrhage based on the percentage of total blood volume lost and the clinical presentation of the patient. 2. compare and contrast the amount of ATP produced during aerobic versus anaerobic metabolism. 3. separate the cardiac cycle into its component parts, distinguishing between the mechanical and electrical elements.

BLOOM'S TAXONOMY OF COGNITIVE OBJECTIVES		
Level of learning	**Associated Verbs**	**Examples of general objectives**
5. **Synthesis:** Opposite of analysis. It involves restructuring to create a new idea by combining together a number of elements in order to form a coherent whole. The process involves logical deduction, and in this sense, the category is intimately concerned with thinking and creativity. Synthesizing or combining elements involves doing something in a unique or original way. The discovery of pattern of structure is an important part of the activity. The sub-categories of synthesis are: production of a unique combination, production of a plan or proposed set of operations and derivation of a set of abstract relations.	Combine, restate, summarize, relate, generalize, conclude, derive, organize, design, deduce, classify, formulate, propose, compose, modify, plan	Upon completion, the successful participant will 1. summarize how the cycle of inflammation and spasm leads to an increase in intracranial pressure. 2. organize the findings of inspection, auscultation, percussion and palpation to deduce the presence or absence of an acute abdomen. 3. generalize the data collected in a neuro exam to determine the potential for injury and determine a plan of care for the patient.
6. **Evaluation**: This represents the highest level in the taxonomy, combining all the previous five categories. Evaluation is concerned with making judgments about the value of ideas or materials. In order to make such an assessment, some yardstick or criterion is necessary as a standard against which things can be measured. The evaluation can be quantitative or qualitative, direct or indirect, subjective or objective. Usually judgments are made in terms of internal evidence; making judgments in terms of external criteria is regarded as the highest level of evaluative activity.	Evaluate, judge, contrast, criticize, defend, support, attack, avoid, seek out, re-order, weigh, modify, verify, decide.	Upon completion, the successful participant will 1. evaluate the CE program in terms of its goals and agreed upon objectives. 2. weigh the value of the in-station learning experience and defend or criticize the continued use of this educational method. 3. judge the advantages of using a taxonomy of educational objectives in creating your assigned educational offering.

Levels of thinking as applied to learning, using the major objectives of the cognitive domain. As adapted from Bloom, B., *Taxonomy of Educational Objectives*: *Cognitive Domain*. Minneapolis: Burgess Publishing.

TAXONOMY OF AFFECTIVE DOMAIN

Receiving/ Attending	Responding	Valuing	Organization of a Value	Characterization by a Value
May not share beliefs, but do what is expected of them. Students act in prescribed manner.	Accepting values			5.00
				Assume accountability for
			4.00	Represent
			Defend	Act consistently
		3.00	Formulate a position	Revise
		Accept	Debate	Synthesize
	2.00	Assist	Is consistent	
	Select	Respect	Organize	
	Listen	Consider	Propose	
	Support	Persist	Criticize	
	Practice	Undertake		
1.00	Act	Assume responsibility		
Share	Ask	Volunteer		
Acknowledge	Challenge	Participate		
Accept	Query			
Listen	Attempt			
Observe				

Verb List for Writing Affective Objectives

Accept	Commend	Join	Request
Acclaim	Compare	Justify	Resist
Adhere	Complete	Modify	Resolve
Adopt	Comply	Obey	Revise
Advocate	Conform	Observe	Seek
Applaud	Control	Organize	Select
Approve	Criticize	Participate	Share
Argue	Debate	Practice	Specify
Ask	Defend	Prefer	Subscribe
Assist	Desire	Promote	Suggest
Assume	Display	Propose	Support
Attempt	Evaluate	Protest	Test
Augment	Examine	Qualify	Theorize
Avoid	Follow	Question	Verify
Balance	Formulate	Read	Visit
Change	Invite	Recommend	Volunteer
Choose	Investigate	Reject	Weigh (judge)
Combine	Initiate	Relinquish	

TAXONOMY OF PSYCHOMOTOR DOMAIN				
1.00	2.00	3.00	4.00	5.00
Imitation	**Manipulation**	**Precision**	**Articulation**	**Naturalization**
Repeat	Practice	Perform with skill	Perform efficiently	Perform proficiently
Return demonstration	Follow procedure	Perform without prompting	Perform accurately	Perform competently

Dave, R. (1970). Psychomotor levels. In, *Developing and Writing Behavioral Objectives* (p. 33). Tucson: Ed Innovators Press.

Verb List for Psychomotor Domain

add	collimate	handle	percuss	shake
adjust	connect	inject	perform	stain
aspirate	construct	inoculate	place	start
assemble	demonstrate	insert	position	stop
auscultate	design	irrigate	prepare	streak
bandage	dilute	locate	puncture	tilt
build	dismantle	make	raise	titrate
calibrate	dispose	manipulate	record	transfer
calculate	drain	mark	remove	transport
center	draw	measure	repair	turn
change	fill	mix	rinse	use
clean	filter	move	select	wash
collect	guide	palpate	set up	wrap

Levels of the Dreyfus Model: From Novice to Expert				
Novice	**Advanced Beginner**	**Competent**	**Proficient**	**Expert**
No experience in the situation in which they are expected to perform task.	Can formulate guidelines for action.	Views own actions in terms of long range plans and goals.	Able to perceive situations as a whole.	Little reliance on rules, guidelines, maxims.
Unable to use discretionary judgment. Legalistic, limited compromise.	Treat all aspects and attributes as equally important.	Has the ability to plan and prioritize.	Able to anticipate clinical events that lead to outcomes. Decision making is less labored.	Intuitive grasp of the situation. Anticipates, aware of subtle changes.
Heavy dependency on policy and procedure.	Will take less time and mental thought to complete task.	Less dependent on policy & procedure.	Large experience framework.	Zeros in on the problem, does not waste time looking for alternate solutions.
Limited ability and inflexible.	Cannot set priorities well.	Able to accomplish complex tasks.	Mastery of advanced technical skills. Ability to automatically do a task.	Holistic, not fractional.
Task oriented. Frustrated if cannot complete the task.	Less frustrated if task not completed.	Lacks speed and flexibility of the proficient.	Able to accurately identify region of the problem.	Interactive from an expert knowledge base.

Benner, P. (March 1982). From novice to expert. *AJN*, pp. 402-407.

Common Action Verbs

Accept	Compile	Engage	Keep	Recommend
Acknowledge	Conduct	Establish	Judge	Record
Acquaint	Confer	Evaluate	Lead	Refer
Acquire	Contact	Exchange	Maintain	Represent
Adapt	Contrast	Examine	Make	Review
Administer	Consult	Execute	Match	Schedule
Affiliate	Control	Explain	Obtain	Seek
Aid	Construct	Express	Order	Select
Analyze	Convince	Formulate	Organize	Sequence
Appraise	Correlate	Gather	Participate	Serve
Apply	Debate	Generalize	Perform	Solve
Approve	Demonstrate	Give	Persuade	Speak
Arrange	Describe	Group	Plan	Specify
Assess	Design	Guide	Predict	Structure
Assemble	Detect	Identify	Prepare	Suggest
Assign	Determine	Illustrate	Present	Supply
Assist	Develop	Implement	Procure	Support
Check	Devise	Inform	Produce	Supervise
Choose	Derive	Install	Promote	Transfer
Cite	Discuss	Interpret	Propose	Up-date
Classify	Disseminate	Interview	Provide	Uphold
Collect	Direct	Introduce	Publicize	Use
Communicate	Employ	Invite	Recall	Utilize
Compare	Encourage	Involve	Recognize	Write

Difference Between GOALS and OBJECTIVES

GOALS: less precise terms Many interpretations	**OBJECTIVES: More precise terms Fewer interpretations**	
Know	Apply	Join
Realize	Assess	Judge
Enjoy	Attempt	List
Believe	Challenge	Offer
Understand	Classify	Order
Is responsible for...	Compare and contrast	Participate
Appreciate	Construct	Predict
Values	Defend	Quantify
Comprehends	Describe	Question
Is aware of...	Diagram	Recall and/or State
Tolerate	Differentiate	Recite
Respects	Discuss	Select
Be familiar with	Display	Sequence
Desires	Dispute	Solve
Feels	Evaluate	Summarize
Grasps the significance of...	Identify	Support
Write	Integrate	Translate
	Interpret	

Examples of cognitive objectives for a CE class on heart failure

KNOWLEDGE OBJECTIVES:

Upon completion of the class, independent study materials, and review of the post-test bank each participant will independently do the following with a degree of accuracy that meets or exceeds the standards established for their scope of practice:

1. Explain the various classifications of HF.
2. Compare & contrast the most common causes of HF.
3. Differentiate by class and general action the most common prescription drugs used to treat HF.
4. Describe the components of history to obtain and the physical exam to be performed on a pt with HF.
5. Interpret presenting S&S to distinguish HF from other cardiac or respiratory pathologies.
6. Sequence the appropriate treatment for a patient with HF and cardiogenic shock according to the NWC EMSS SOPs.
7. Explain the physiologic benefits of using CPAP for pts with HF.
8. State the drug profile for NTG and appropriate dosing in HF.
9. Identify the patient with HF that may benefit from the use of midazolam for anxiety.
10. Evaluate and critique PCRs documented by System members for pts with HF.
11. Analyze QI data for patients with HF treated by System agencies and identify opportunities for improvement as they relate to field practice.
12. Describe the purpose and function of alternate interventions for HF such as left ventricular assist devices (LVAD).