

ACPE's Types of Continuing Pharmacy Education

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In formulating the original concept for ACPE's types of continuing-pharmacy-education (CPE) activities, ACPE proposed a model that was based on existing theories that are well accepted by educators and also easy to understand and implement. As a result of comments from the CE Advisory Committee, CE Commission and CE Providers during the standards-revision process, the implementation details of the three CPE activity types has evolved into the Knowledge, Application and Practice-based; nevertheless, the core educational principles underlying them have remained the same.

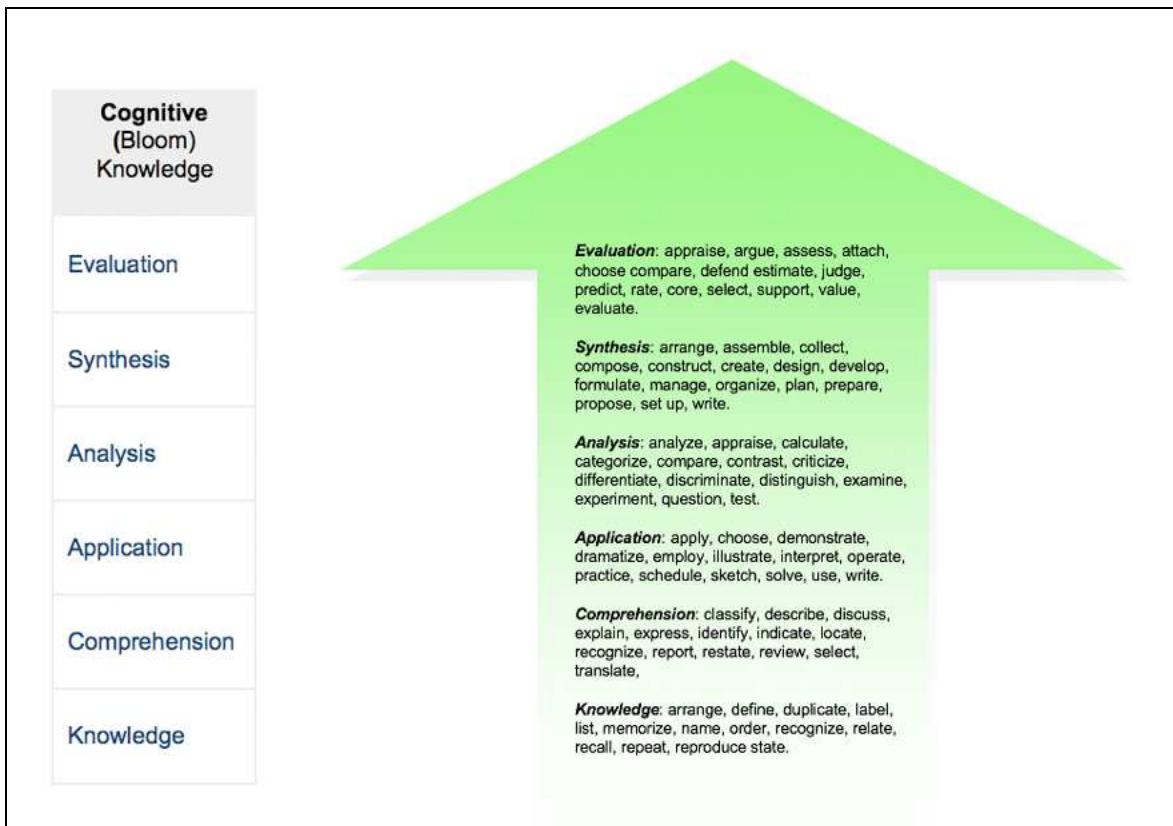


Figure 1. Bloom's Cognitive Taxonomy of learning with verbs.

ACPE's types of CPE are based on taxonomies of learning which have been recommended by ACPE staff for several years for developing activity objectives for CE programs. Learning taxonomies are hierarchical descriptions of learner behavior and development with the simplest behaviors at the bottom and the most complex ones at the top. Each category or level of the hierarchy has an associated set of verbs that define what a learner at a given level is able to do. Consequently, the verbs can be used not only to assess and describe a learner's current stage of development, but can also be used to prescribe what learner must do to progress to higher levels of learning. Although Bloom's Cognitive taxonomy is most frequently cited and used, other taxonomies exist for learning psychomotor skills and for learning attitudes (See Figure 1). By developing the CPE activities using taxonomies of learning, the resulting content should emphasize what practitioners are able to do, from how the objectives are defined, to the development of tasks for learning, to the assessment of the learner.

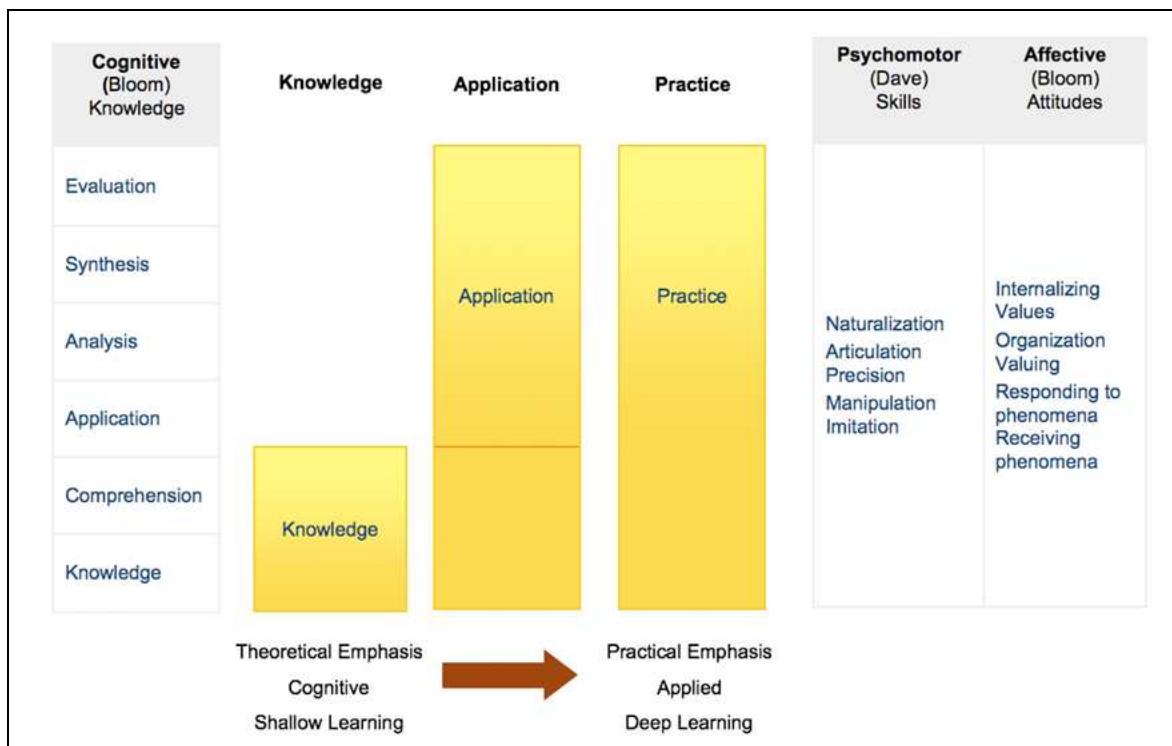


Figure 2. ACPE's 3 types of CPE Activities relative to taxonomies of learning.

ACPE has defined and named three types of CPE activities, Knowledge, Application and Practice, based on the broad range of activities used for teaching pharmacy practitioners today:

Knowledge-based CPE activities: These CPE activities should be designed for participants to acquire factual information (minimum credit: 0.25 contact hours per 15 minutes). Knowledge-based CPE activities begin at the Knowledge level of Bloom's taxonomy through to the Comprehension level, encompassing the following verbs that should be used for developing performance objectives, learner assessments and learning tasks.

- **Comprehension:** classify, describe, discuss, explain, express, identify, indicate, locate, recognize, report, restate, review, select, translate.
 - **Knowledge:** arrange, define, duplicate, label, list, memorize, name, order, recognize, relate, recall, repeat, reproduce, state.

Application-based CPE activities: These CPE activities should be designed for participants to learn concepts and apply information during the activity (minimum credit: 1.0 contact hour per 60 minutes). Although application-based CPE activities may include foundational knowledge, they are primarily intended to begin at the Application level of Bloom's taxonomy through to the Evaluation level, encompassing the following verbs that should be used for developing performance objectives, learner assessments and learning tasks:

- **Evaluation:** appraise, argue, assess, attach, choose compare, defend estimate, judge, predict, rate, rate, core, select, support, value, evaluate.
 - **Synthesis:** arrange, assemble, collect, compose, construct, create, design, develop, formulate, manage, organize, plan, prepare, propose, set up, write.
 - **Analysis:** analyze, appraise, calculate, categorize, compare, contrast, criticize, differentiate, discriminate, distinguish, examine, experiment, question, test.
 - **Application:** apply, choose, demonstrate, dramatize, employ, illustrate, interpret, operate, practice, schedule, sketch, solve, use, write.

Practice-based CPE activities: These CPE activities should include a didactic component and a practice component and should be designed for participants to systematically acquire specific knowledge, skills, attitudes, and performance behaviors that expand or enhance practice competencies (minimum credit: 15 contact hours). Practice-based CPE activities should include the upper levels of Bloom's cognitive taxonomy, but may also include lower levels for foundational knowledge. Because these activities emphasize the use of knowledge and skills in real-life practice, as well as the development of clinical-practice values, practice-based CPE activities should also be created using learning taxonomies for psychomotor skills and for attitudes. The two additional taxonomies encompass the following verbs that should be used for developing performance objectives, learner assessments and learning tasks:

Psychomotor Domain¹

- **Naturalization:** Design, specify, manage, invent, and project-manage
- **Articulation:** Construct, solve, combine, coordinate, integrate, adapt, develop, formulate, modify, master, improve, and teach
- **Precision:** Demonstrate, complete, show, perfect, calibrate, control, and practice
- **Manipulation:** Re-create, build, perform, execute, and implement
- **Imitation:** Copy, follow, replicate, repeat, adhere, observe, identify, mimic, try, reenact, and imitate

Affective Domain²

- **Internalizing values (characterization):** acts, discriminates, displays, influences, listens, modifies, performs, practices, proposes, qualifies, questions, revises, serves, solves, verifies.
- **Organization:** adheres, alters, arranges, combines, compares, completes, defends, explains, formulates, generalizes, identifies, integrates, modifies, orders, organizes, prepares, relates, synthesizes.
- **Valuing:** completes, demonstrates, differentiates, explains, follows, forms, initiates, invites, joins, justifies, proposes, reads, reports, selects, shares, studies, works.
- **Responding to Phenomena:** answers, assists, aids, complies, conforms, discusses, greets, helps, labels, performs, practices, presents, reads, recites, reports, selects, tells, writes.
- **Receiving Phenomena:** asks, chooses, describes, follows, gives, holds, identifies, locates, names, points to, selects, sits, erects, replies, uses.

Although *Figure 2* depicts each type of learning as discreet, in reality, CPE activities will fall along a continuum of learning, starting at Knowledge, moving through Application, and ending at Practice. Learning across this continuum will generally progress from being more cognitive, theoretical and shallow at the knowledge end to becoming more practical, applied and deep at the practice end, including additional elements from psychomotor and affective domains that emphasize the systematic application of content, skills and attitudes to real-life practice.

The provider must also consider what learners bring into a learning activity, because prior knowledge will have an impact on the degree to which they can benefit from an activity. Educational research supports the common-sense opinion that a meaningful context will make information easier to learn, because meaningful context helps people build new knowledge into

¹ Dave, R. H. (1975). *Developing and Writing Behavioural Objectives*. (R J Armstrong, ed.) Educational Innovators Press.

² Krathwohl, D. R., Bloom, B. S., & Masia, B. B. (1973). *Taxonomy of Educational Objectives, the Classification of Educational Goals. Handbook II: Affective Domain*. New York: David McKay Co., Inc.

their existing, knowledge. A study by Bransford and Johnson illustrated the importance of having a meaningful context by showing that listeners could recall more of a short paragraph when they had a meaningful, visual context than if they just heard the paragraph repeatedly or were given a non-meaningful context.

If the balloons popped, the sound wouldn't be able to carry since everything would be too far away from the correct floor. A closed window would also prevent the sound from carrying, since most buildings tend to be well insulated. Since the whole operation depends on a steady flow of electricity, a break in the middle of the wire would also cause problems. Of course, the fellow could shout, but the human voice isn't loud enough to carry that far. An additional problem is that a string could break on the instrument. Then there could be no accompaniment to the message. It's clear that the best situation would involve less distance. Then there would be fewer potential problems. With face to face contact, the least number of things could go wrong.³

Readers who do not know the context for this paragraph have a difficultly understanding it and recalling details over time. However, the correct visual context makes the paragraph completely comprehensible and relatively easy to remember (Note: the visual organizer for the paragraph is provided at the end of this document). Bransford and Johnson's study shows that meaningful context helps people to integrate new knowledge into existing knowledge, and secondarily highlights the value of using multi-sensory approaches such as combining text with images. The following can be said about learners in general, and adult learners in particular:

- People learn by building new knowledge into existing “general” knowledge.
- New information must be presented in a meaningful context to be understood.
- Learning similar information from different perspectives increases the depth of learning
- Active learning and multi-sensory approaches increase retention
- Personally-relevant information is more readily learned.
- Strong positive or negative emotions can affect learning.

What qualifies as a meaningful context for one learner may not for another, because of the role of prior knowledge. For example, a single phrase like “heart disease” might be sufficient to cause a cardiology expert to automatically draw upon years of learning and experience in order to understand and remember a CPE activity on treatments for cardiac emergencies; however, someone else with less knowledge and experience will need more explicit and developed contextual information in order to learn the same material. In fact, the bigger the gap between a learner’s current knowledge and the new knowledge to be learned, the greater the need for meaningful context. The end result is that the effectiveness or relevance of a CPE activity depends on the depth and complexity of cognitive structures (or “schema”) of the learner. More specifically, advanced learners, who by definition have well-developed schema, are able to learn, retain and apply information more readily than novice learners, who have less-well-developed schema. Novice learners are not necessarily less intelligent than advanced learners; they simply have less experience in the subject. For example, our expert in cardiology may be a total novice in the area of the treatment of infectious diseases.:.

Novice Learners have little prior learning and experience in the topic and consequently less-developed cognitive structures (schema). They need more guidance when learning, because they often “don’t know what they don’t know.”

- Knowledge CPE Activities: Useful for information that does not need to be used immediately, but can serve to jog one’s memory for later follow-up such as drug therapy updates or information summaries.

³ Bransford, J. D., Johnson, M. K. (1972) Journal of Learning and Verbal Behavior 11, 717-726, *Contextual Prerequisites for Understanding: Some Investigations of Comprehension and Recall*.

- Application CPE Activities: Useful for new concepts that can be applied with a practitioners general skills and broad knowledge, e.g., geriatrics, or diabetes....
- Practice CPE Activities: Useful for bringing novice learners to intermediate or even advanced levels by developing knowledge, skills and attitudes over an extended period of time which includes real-life practice.

Advanced Learners have extensive prior learning and experience in the topic and consequently more highly-developed schema. They are self-directed learners and often are aware of what they do and do not know.

- Knowledge CPE Activities: Useful for detailed information that can be applied immediately, with little follow-up needed, i.e., point of care learning.
- Application CPE Activities: Useful for new concepts that require specific skills and knowledge in order to be used, e.g., drug therapy monitoring of a specific disease in a specific patient populations.
- Practice: Useful for refining knowledge, attitudes and skills, especially where real-life practice is required to develop or assess them over time.

	Knowledge	Application	Practice
Novice Learners	General updates and summaries	Umbrella Topics, E.g., Diabetes, Geriatrics	Certificate Programs
Advanced Learners	Information for immediate use, E.g. Point of Care Learning (CME)	Drug therapy Specific Topics	Certificate Programs (at more advanced levels)

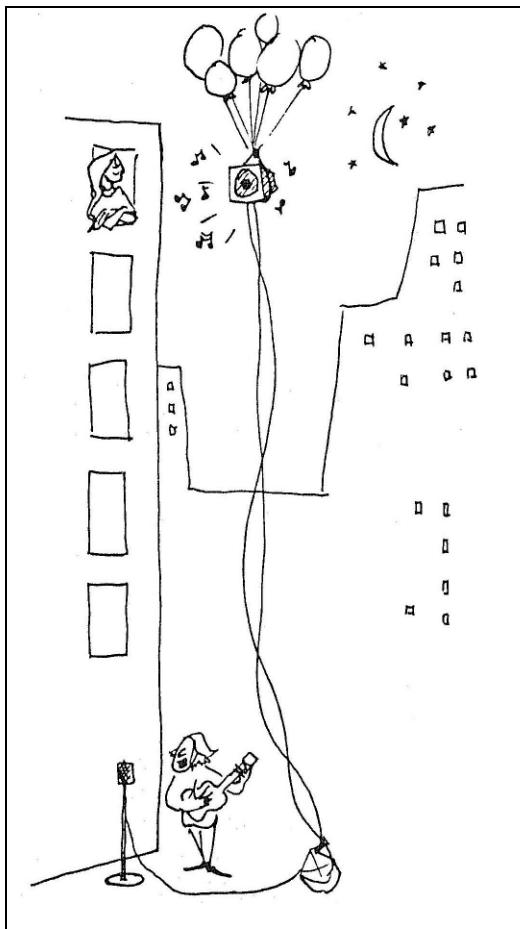
The explicit definition and delineation of three types of CPE activities is new for ACPE; however, aside from the lower minimum time required for Knowledge-based CPE activities and the integration of the standards for providers of certificate programs into the “general” standards, the expectations for active learning and the assessment of learning still remain integral to ACPE’s new standards. Providers are encouraged to develop programs that include in-class opportunities to learn the content, especially where it is primarily facts or information. Information from lengthy, fact-based presentations without active learning is less likely to be retained, especially for learners who are novices in the content area.

Minimum acceptable learning assessments have also been specified for the three CPE activity types; however, the learning assessment tools and strategies should be based on the objectives for the program. In fact, instructional designers often recommend that learning assessments be developed before planning the instruction to assure that the objectives are indeed measurable and to assure that the content and activities meet all the objectives.

	Knowledge	Application	Practice
Presentation and activities	15-minute minimum and opportunities for active learning	60-minute minimum and opportunities to discuss, perform and reflect	Long-term, repeated exposure of increasing difficulty with opportunities to use content in context
Learning Assessment	Recall of facts, use of data	Performance questions, case studies	Performance questions case studies, experiential activities

The three types of CPE activities are designed to accommodate and maximize the learning of pharmacists while providing appropriate credit and are guided by practical learning theories. Although many approaches may be used to develop CPE activities, ACPE recommends that the CPE activity types be taken into consideration when designing activities for practitioners:

- Select the most effective type of ACPE CPE Activity (Knowledge, Application or Practice) for the learning task and expertise of the participant (novice through advanced)
- Use taxonomies of learning to develop objectives that state what participants will be able to do at the end of the activity
- Develop learning assessment tools and strategies based on the objectives
- Develop multi-sensory, active-learning tasks for the activity that not only allow participants to achieve the objectives, but also promote long-term retention of knowledge, skills or attitudes



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Figure 3. Contextual organizer and paragraphed used in Bransford and Johnson's 1972 study.