



Teaching Notes for Physicians:

Writing Effective Learning Objectives

Objectives:

By the end of these teaching notes the reader will be able to:

1. List three purposes of learning objectives in medical education.
2. Select appropriate verbs for objectives using Bloom's taxonomy
3. Construct effective learning objectives for their own teaching activities using the ABCD method

Background

The emphasis on learning objectives has been the natural product of a major paradigm shift in medical education. The idea seems simple and intuitive, start by focusing on what we expect the product to look like. What knowledge, skills and attitudes will our learners possess? Over the past two decades, with this new direction the emphasis has shifted from the educational *process* as the primary focus (e.g. problem based learning) to the *outcomes*¹. Initiatives such as the CanMEDS framework from the Royal College of Physicians and Surgeons of Canada (RCPSC) illustrate the impact of this shift².

Why do we need learning objectives?

The terms outcomes and objectives are sometimes used interchangeably. However, it may be useful to think of outcomes as a broad statements and objectives as the individual steps required to reach these ultimate goals. For example, undergraduate

medical education's BIG 10 objectives define the abilities that a graduating medical student should possess³. Each course that the student takes (and each learning activity within them) will have more specific learning objectives. Learning objectives serve a number of important purposes:

Purpose of learning objectives:

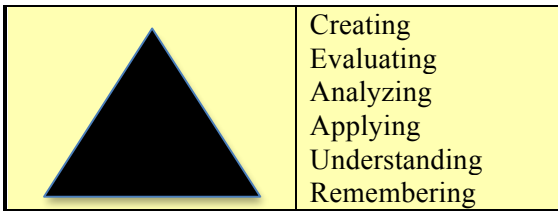
- Determine curricular content (what should be taught?)
- Suggest appropriate teaching methods (how should we teach it?)
- Guide assessment of learning

Whether you are giving a talk at rounds, leading a small series of seminars or lectures or directing a course you will need well written learning objectives to optimize the educational experience.

Bloom's Taxonomy

An understanding of Bloom's taxonomy can be a useful tool in the writing of effective learning objectives. Named after Benjamin Bloom, an educational psychologist who chaired the development committee, the taxonomy classifies learning objectives in the cognitive, affective and psychomotor domains into levels of complexity⁴. The cognitive domain describes intellectual skills relevant to learning objectives in medical education. This was first published in 1956. The taxonomy was then revised 50 years later to incorporate new insights from learning theory and research^{5,6}.

Revised Taxonomy – Cognitive Domain^{5,6}



The taxonomy is typically represented as a pyramid with lower order thinking skills on the bottom and more complex skills near the top. This illustrates the assertion that a larger number of lower order skills must be acquired to support higher order learning. Thus it is important to consider your learning experience within the context of the larger curriculum and the learners⁷:

- Is this an introductory course or a more advanced learning experience?
- What is the background knowledge and experience of the learners?

Bloom's Taxonomy → Objectives

Each level of the taxonomy describes the type of skill a learner should be able to demonstrate. Placing each within a level of the taxonomy will help to guide the verbs used to write objectives^{7,8,9,10}:

1. Remembering (recall facts & terminology)
 - Sample verbs: list, recall, define
2. Understanding (grasps meaning, can summarize or explain in own words)
 - Sample verbs: explain, summarize
3. Applying (Solve problems in similar situations using 1&2)
 - Sample verbs: demonstrate, produce, solve
4. Analyzing (recognize hidden assumptions & generalize to other situations)
 - Sample verbs: contrast, examine, select

5. Evaluating (compare treatments / algorithms)
 - Sample verbs: judge, recommend, criticize
6. Creating (generate new hypothesis)
 - Sample verbs: formulate, manage, compose

Tips for writing objectives

Once the context of your learning activity has been considered and appropriate skills identified using Blooms taxonomy you can focus on writing your objectives. In doing so, the mnemonic SMART is useful in ensuring your objectives will be effective.

SMART objectives¹¹

- S – Specific**
- M – Measurable**
- A – Attainable**
- R – Relevant**
- T – Time Related**

Learning objectives should be *specific*. This provides clear expectations and guides learning. For example, compare the following objectives:

1. “By the end of this lecture students will be familiar with the causes of pneumonia”
2. “By the end of this lecture students will be able to list the three most common organisms causing community acquired pneumonia”

To guide assessment objectives must also be *measurable*. Avoid using verbs such as appreciate or understand which are vague and difficult to measure. It is important that the objectives laid out are also *attainable*. This of course must take into account the context of the learning experience and Bloom's Taxonomy. For example,

following a one-hour introductory lecture on thyroid physiology the outcome “...learners will be able to manage patients with complex thyroid pathology” is likely unattainable.

Objectives should be *relevant* to the learner and the educational experience. Is this something the learner needs to know? Is this something that fits into the larger educational goals of the current course or degree? Finally, objectives should be *Time Related*. Terms such as “by the end of this lecture” or “at the conclusion of this course” define when it is expected that the learner will have acquired the described skills.

Constructing Objectives – ABCD Method^{9,11}

A	Audience
B	Behaviour
C	Condition
D	Degree

Any learning objective must first identify the *audience* to which it applies. Depending on the learning activity this may be quite specific or more general (e.g. “students in the internal medicine clerkship” vs. “participants in this workshop”). The second necessary component of a learning objective specifies the *behaviour* to be observed. Recall that attention to Bloom’s taxonomy and the context of learning will guide this process.

The *condition* specifies the context (setting & resources) in which the skill (*behaviour*) should be observed. This could include states such as:

1. “...on a test”
2. “...using ____ (a tool or reference)”
3. “...evaluating patients in the emergency room”

Finally, a learning objective should indicate the level (*degree*) of performance expected. In more simple tasks this can be quite specific. For example, after a

typing/keyboarding class learners might be expected to: “complete a standard paragraph in less than 60 seconds with no more than 3 errors”. In more complex settings (including clinical practice) this is more difficult but one should strive to be as specific as possible. For example, a clinical clerk might be expected to generate: “an appropriate differential including the three most likely diagnoses”.

Use the ABCD tool to evaluate learning objectives you have written. For example, the third learning objective of these teaching notes reads: “By the end of these teaching notes **the reader (A)** will be able to **construct (B) effective (D) learning objectives for their own teaching activities using the ABCD method (C)**”

Enjoy your teaching!

For further information or confidential no-charge teaching consultations, contact us:

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References

- (1) **Cooke M, Irby DM, O'Brien BC. Educating physicians : a call for reform of medical schools and residency, San Fransisco 2010 Jossey-Bass**
- (2) **Frank JR, Danoff D. The CanMEDS initiative: implementing an outcomes-based framework of physician competencies *Medical Teacher* 2007 29(7):642-647**
- (3) **Big 10 Graduations Objectives, Undergraduate Medical Education, Cumming School of Medicine, University of Calgary**

- retrieved Jan 28, 2016 from:
<http://www.ucalgary.ca/mdprogram/about-us/big-10-graduation-educational-objectives>
- (4) Bloom BS. Taxonomy of educational objectives: the classification of educational goals. New York, NY: Longmans, Green 1956
- (5) Anderson LW, Krathwohl DR. A taxonomy for learning, teaching and assessing: a revision of Bloom's taxonomy of educational objectives. New York, NY Longmans 2001
- (6) Adams NE. Bloom's taxonomy of cognitive learning objectives. *Journal of the Medical Library Association* 2015 103(3):152
- (7) Quick tips for writing goals and objectives, Office of Continuing Education and Professional Development, Faculty of Medicine, University of Toronto retrieved Jan 28 ,2016 from:
http://www.cpd.utoronto.ca/newsletter/2009_fall/Quick_Tips_Writing_Goals_Objectives.pdf
- (8) List of verbs for formulating educational objectives, Royal College of Physicians and Surgeons of Canada. Retrieved Jan 28, 2016 from:
http://www.royalcollege.ca/portal/page/portal/rc/common/documents/cpd_accreditation/verbs_educational_objectives_e.pdf
- (9) Ferguson LM. Writing Learning Objectives. *Journal of Nursing Staff Development* (1998) 14(2):87-94
- (10) Houlden RL, Frid PJ, Collier CP. Learning Outcome Objectives
- Annals RCPSC* (1998) 31(7): 327-332
- (11) Nicholson K Ontario Universities Council on Quality Assurance: Writing Learning Outcomes, McMaster University retrieved on Jan 28,2016 from:
<http://ccl.mcmaster.ca/COU/pdf/Brief%201%20Learning%20Outcomes.pdf>