Curriculum Development
in 6 easy steps –
for busy Med-Ed types

Joanne Lynn MD

Curriculum Development in MedEd

- Medical educators are often charged to plan educational experiences without specific training in education, often with limited resources and other various restraints
- I had the opportunity to take an online course from U Cincinnati on Curriculum Development and will present a condensed summary of that simple, logical and practical approach to curricular planning that might be helpful –

Text

- Text: Kern DE, et al: *Curriculum Development for Medical Education – A Six-Step Approach.* Baltimore: The Johns Hopkins Univ. Press. 1998
- (Now in 2nd edition, 2009)

Dedication: *To the many faculty members who strive to improve medical education by developing, implementing, and evaluating curricula in the health sciences*

Curriculum

- *Curriculum* derives from Latin word for 'race course'
- Definition - a planned educational experience

Curricular Development – A Six Step Approach

- Derives from approaches developed by HildaTaba (student of John Dewey – teach concepts not just facts and teach for desire outcomes), McGaghie (1978), et al.
- They advocate linking of curriculum to health care needs

Assumptions

- Educational programs have aims and goals (even when they are not clearly articulated)
- Medical educators have a professional and ethical obligation to meet the needs of their learners, patients and society
- Medical educators should be held accountable for the outcomes of their interventions
- A logical systematic approach to curriculum development will help achieve these ends

Curricular Development – A Six Step Approach for Med Ed

1) Problem Identification and General Needs Assessment
2) Needs assessment for targeted learners
3) Goals and objectives
4) Educational Strategies
5) Implementation
6) Evaluation and Feedback

Six- Step Approach to Curriculum Development

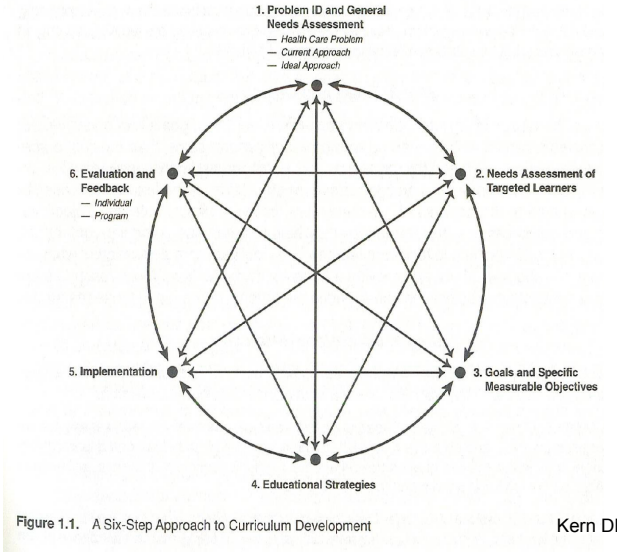


Figure 1.1. A Six-Step Approach to Curriculum Development

Kern DE, 1998

Step 1: Problem identification/ General Needs Assessment

- Step 1 starts with the identification and analysis of a health care need or other problem that is to be addressed by the curriculum

Examples:

- Health care needs of a particular cultural group
- Need to assure HCP competency in communication skills, procedures, etc.

Identification of the Health Care Problem

- **Clear definition** of the problem helps to focus a curriculum's goals and objectives which in turn helps to focus the curriculum's educational and evaluation strategies
- A comprehensive definition of problem includes consideration of **epidemiology**, **impact** on patients, health care professionals and society

Table 2.1. Identification and Characterization of the Health Care Problem

Whom does it affect?
- Patients
- Health care professionals
- Society

What does it affect?
- Clinical outcomes
- Quality of life
- Quality of health care
- Use of health care and other resources
- Medical and nonmedical costs
- Patient and provider satisfaction
- Work and productivity
- Societal function

What is the *quantitative and qualitative importance* of the effects?

Kern DE, 1998

Step 1: Problem identification/ Needs Assessment

- How it is currently being addressed?
- How it should be addressed – what is the ideal approach?
- The difference between how the problem is currently being addressed and how it should ideally be addressed is the **general needs assessment**

Table 2.2. The General Needs Assessment

What is *currently* being done by the following?
- Patients
- Health care professionals
- Medical educators
- Society

What personal and environmental factors affect the problem?
- Predisposing
- Enabling
- Reinforcing

Ideally, what should be done by the following?
- Patients
- Health care professionals
- Medical educators
- Society

What are the key *differences* between the current and ideal approaches?

Kern DE, 1998

Table 2.3. Methods for Obtaining the Necessary Information

Review of Available Information
- Published literature
- Reports by professional societies or government agencies
- Documents submitted to educational clearinghouses
- Curriculum documents from other institutions
- Patient education materials prepared by foundations or professional organizations
- Public health statistics
- Clinical registry data
- Administrative claims data

Use of Consultants/Experts
- Informal consultation
- Formal consultation
- Meetings of experts

Collection of New Information
- Surveys of patients, practitioners, or experts
- Focus group(s)
- Nominal group technique
- Group-mailed delphi technique
- Daily diaries by patients and practitioners
- Observation of tasks performed by practitioners
- Time and motion studies
- Critical incident reviews
- Study of ideal performance cases or role model practitioners

Step 1: Problem Identification

- Clarification of the health care problem to be addressed and the current and ideal approaches to addressing the problem is required to focus the education intervention towards solving the problem
- Conclusions from this step may or may not apply to a particular group of learners so the next step is to perform an explicit assessment of the specific needs of the targeted learners

Step 2: Needs Assessment of Targeted Learners

Operational Definition:

A needs assessment of targeted learners is a process by which the curriculum developers identify the differences between the ideal and actual characteristics of the targeted learner group and their environment

Identification / Needs of Targeted Learners

- Identify targeted learners
- Consider whether an educational intervention directed at this group will contribute to solving the health care problem
- Learn about targeted learners to decide what information is most needed

Desired information about learners

- Previous and already planned training
- Existing proficiencies, current performance
- Perceived deficiencies and needs
- Learning styles, preferences regarding different learning strategies
- Barriers, enabling and reinforcing factors
- Resources available: clinical experiences, information resources, teachers, IT

Methods for Learner Needs Assessment

- Informal discussions / Formal interviews
- Focus group discussions
- Questionnaires
- Direct observation of skills
- Examinations
- Audits of current performance
- Strategic planning session

Step 3: Goals and Objectives

- After the needs of learners have been clarified, the curriculum is targeted to address these needs by setting goals and objectives
- A goal or objective is defined as an end toward which an effort is directed
- Goal - broad educational objective or directive
  - Communicates the overall purposes of the curriculum
- Objective – more specific educational directive that is usually stated behaviorally, i.e. it is measurable

Important Functions of Goals and Objectives

- Direct the choice of curricular content and assignment of relative priorities
- Suggest what learning methods will be effective
- Enable evaluation of learners and curriculum
- Suggest what evaluation methods are appropriate
- Communicates to others what the curriculum addresses and hopes to achieve

Writing Objectives

Writing goals and objectives is an underappreciated skill

Five basic elements:

- Who
- Will do
- How much (how well)
- Of what
- By when?

Writing Objectives

- Use words that are specific and unequivocal for objectives
- Example: Each third year medical student **(who)** will demonstrate **(will do)** the appropriate technique for a lumbar puncture procedure **(what)** once **(how often)** meeting criteria on check list as judged by a trained observer **(how well)** by the end of their neurology rotation **(when).**

Types of Objectives

Objectives may be written for:

- Individual learner
- Learners in aggregate
- Educational program
  - E.g. By the end of the clerkship, 90% or more of students will score at least 75% on the NBME subject examination.

Objectives fall into 3 domains

- Cognitive – ranges from factual knowledge to higher levels of function such as problem solving and clinical decision making
- Affective (attitudinal) – attitudes, values, beliefs, biases, emotions and role expectations
- Psychomotor – skill or behavioral objectives (hx-taking, PE, interpersonal communication, record keeping, procedures)

Bloom's Taxonomy of Cognitive Domain -by level of complexity and abstraction

Major categories in the cognitive domain of the taxonomy of educational objectives (Bloom, 1956).

Krathwohl's Taxonomy of Affective Domain – ordered by level of internalization of values

Krathwohl, D.R., Bloom, B.S., and Masia, B.B. (1964). *Taxonomy of educational objectives: Handbook II: Affective domain*. New York: David McKay Co.

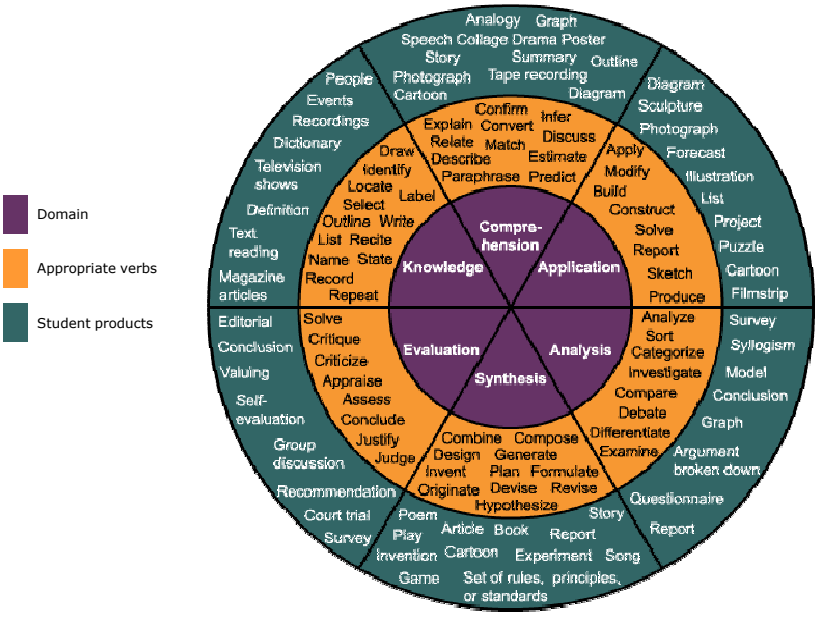
Harrow's Taxonomy of Psychomotor Domain

Harrow, A.J. (1972). *A taxonomy of the psychomotor domain*. New York: David McKay Co.

Writing Learning Objectives

- In writing behavioral objectives always use active verbs because active verbs most often imply measurability.
- Choose the verbs from the taxonomies of Bloom, Krathwohl, and Harrow (readily available all over the www). This allows for the ready assessment of the level of difficulty, challenge, or depth intended

Verb Wheel based on Bloom's Taxonomy



Bloom's taxonomy verbs

Skill	Sample prompts	Purpose	Level
Remembering	*recognize, list, describe, identify, retrieve, name*	memorize and recall facts	LOWER
Understanding	*describe, explain, estimate, predict*	understand and interpret meaning	
Applying	*implement, carry out, use, apply, show, solve*	apply knowledge to new situations	
Analyzing	*compare, organize, cite differences, deconstruct*	break down or examine information	HIGHER
Evaluating	*check, critique, judge hypotheses, conclude, explain*	judge or decide according to a set of criteria	
Creating	*design, construct, plan, produce*	combine elements into a new pattern or product	

Additional objectives

- Process objectives – relate to the implementation of the curriculum

Examples:

- Individual – Each student in the ortho clerkship will spend four three hour sessions in an ambulatory setting
- Program – by the end of the clerkship, 90% or more of students will turn in their evaluation form

Outcome objectives

- Outcome objectives relate to potential effects or outcomes of a curriculum that exceed those outlined in its learner and process objectives.
- Examples might include health outcomes of patients, or career choices of students.

Knowledge Objectives

Vague	**More Specific**
• Know or understand	• List • Recite • Present • Distinguish • Define • Describe • Give an example of

Skill Objectives

Vague

- Be able
- Know how

More Specific

- Demonstrate (as measured by)
- Use or incorporate into performance (as measured by)

Attitudinal Objectives

Vague

- Appreciate
- Grasp the significance of
- Believe
- Enjoy
- Learn
- Teach

More Specific

- Rank as valuable
- Rank as important
- Identify, rate or rank as a belief or opinion
- Rate as enjoyable

Kern et al. on outcome objectives

"It is often unrealistic to expect medical curricula to have easily measurable effects on quality of pt care and pt outcomes…. However, …medical curricula should be designed to have positive effects on quality of care and patient outcomes. Even if outcomes will be … impossible to measure, the inclusion of some outcome objectives in a curriculum plan will emphasize the ultimate aims of the curriculum."

More on Objectives

- Most educational experiences are much more than a list of pre-established objectives
- Much learning results from unanticipated learning experiences and pursuit of learning needs identified during the experience
- An exhaustive list of objectives can
  - Be overwhelming
  - Limit creativity
  - Limit learning related to individual needs and experiences

Goal/Objective	Level of Generality I, II, III	Program or Individual	Cognitive, Affective, Psychomotor	Level of Abstraction (Taxonomies)

Step 4: Educational Strategies

Once the goals and objectives are determined, the next step is to develop educational strategies

- ***Content*** – specific material to be included in the curriculum
- ***Methods*** – ways in which content is presented
- *The content of the curriculum flows from its specific measurable objectives*

Guidelines for choice of Educational Methods

- Maintain congruence between objectives and methods
  - select methods appropriate for cognitive, affective and psychomotor objectives
- Use multiple educational methods
  - To meet different learning styles and motivations, maintain learner interest and reinforcement of learning (to deepen learning and promote retention)
- Choose educational methods that are feasible in terms of resources

Methods for meeting cognitive objectives

- Readings
- Lectures
- Audiovisual materials
- Discussion
- Problem-solving exercises
- Programmed learning
- Learning projects

Methods for Achieving Affective Objectives

Attitudinal changes requires exposure to knowledge, experiences or the views of respected others that contradict undesired or confirm desired attitudes

- Exposure (readings, discussion, experiences)
- Facilitation of openness, introspection and reflection
- Role models

Methods for achieving psychomotor objectives

- Supervised clinical experiences
- Simulations
  - Artificial models
  - Role-plays
  - Standardized patients
- Audio or visual reviews of skills

Learning of Skills is facilitated by cycle

- Introduction to skills by didactic presentations, demonstrations, discussion
- Opportunity to practice skills
- Opportunity to reflect upon performance
- Feedback on performance
- Repeat cycle until mastery is achieved

In a safe and supportive learning environment

Strategies to Promote Self-Directed Learning

- Training in skills relevant to SDL:
  - Self-assessment
  - Information searching
  - Critical appraisal
  - Clinical decision making
- Independent-Learning Projects
- Personal-Learning Plans or Contracts
- Formulating / Answering one's own questions
- Role modeling

Educational Strategies for Promoting Teamwork

- Collaborative learning experiences
  - E.g. TBL
- Work environments that model effective team work
- Assessments of team function
- Training in team skills

Step 5: Implementation

Identify resources needed:

- Personnel: faculty, secretarial / administrative support, patients
- Time: faculty, support staff, learners
- Facilities: space, equipment, clinical sites
- Funding/costs: direct financial costs, hidden or opportunity costs

Step 5: Implementation

Obtain support:

- Internal – from administrative authority (dean's office, hospital administration, department chair, program director, faculty, learners, other stakeholders for personnel, resources, political support
- Outside – government, professional societies, managed care, donors for funding, political support, curricular or faculty development resources

Step 5: Implementation

Develop administrative mechanisms

- Administrative structure to delineate responsibilities and decision making
- Communication
  - Content: rationale, goals and objectives, scheduling, evaluation, results
  - Mechanisms – meetings, syllabus materials, reports, site visits
- Operations – preparation of schedules, materials, collection and analysis of evaluation data, etc.

Step 5: Implementation

Anticipate and address barriers

- Financial and other resources
- Competing demands
- People: attitudes, job/role security, power

Step 5: Implementation

Plan to introduce the curriculum:

- Pilot
- Phase-in
- Full implementation

Table 6.1. Checklist for Implementation

- ____ Identify resources
  - ____ Personnel: faculty, secretarial and other support staff, patients, other
  - ____ Time: faculty, support staff, learners
  - ____ Facilities: space, equipment, clinical sites
  - ____ Funding/Costs: direct financial costs, hidden or opportunity costs
- ____ Obtain support
  - ____ Internal
    - From: those with administrative authority (dean's office, hospital administration, department chair, program director, division director, etc.), faculty, learners, other stakeholders
    - For: personnel, resources, political support
  - ____ External
    - From: government, professional societies, philanthropic organizations or foundations, other entities (e.g., managed care organizations), individual donors
    - For: funding, political support, curricular or faculty development resources
- ____ Develop administrative mechanisms to support the curriculum.
  - ____ Administrative structure: to delineate responsibilities and decision making
  - ____ Communication
    - Content: rationale; goals and objectives; information about the curriculum, learners, faculty, facilities and equipment, scheduling; changes in the curriculum; evaluation results; etc.
    - Mechanisms: memos, meetings, syllabus materials, site visits, reports, etc.
  - ____ Operations: preparation and distribution of schedules and curricular materials; collection, collation, and distribution of evaluation data; curricular revisions and changes, etc.
- ____ Anticipate and address barriers.
  - ____ Financial and other resources
  - ____ Competing demands
  - ____ People: attitudes, job/role security, power and authority, etc.
- __ Plan to introduce the curriculum.
  - ____ Pilot
  - ____ Phase-in
  - ____ Full Implementation

Step 6: Evaluation and Feedback

Step 6 closes the loop in the curriculum development cycle and

- Provides information to guide individuals and the curriculum in cycles of improvement
- Evaluation results can be used to
  - seek support for curriculum,
  - assess individual achievement
  - satisfy external requirements
  - serve as a basis for presentations and publications

Step 6: Evaluation and Feedback

- Identify users, uses and resources
- Identify evaluation questions and designs
- Choose Measurement methods and construct instruments
- Address ethical concerns
- Collect data
- Analyze data
- Report results

Evaluation Types: Levels and Uses

Use	Individual (Faculty / Learners)	Program
Formative	Evaluation of individual learner or faculty member used to help individual improve performance: • Identify areas for improvement • Specific suggestions for improvement	Evaluation of a program that is used to improve program performance: •Identification of areas for improvement •Specific suggestions for improvement
Summative	Evaluation used for judgments or decisions about the individual: •Verification of achievement •Motivation of individual to maintain or improve performance •Certification of performance for others •Grades •Promotion	Evaluation of a program used for judgment / decisions re the program or its developers: •Judgment re success, efficacy • Allocation of resources •Motivation/recruitment of faculty and learners •Satisfying outside requirements •Dissemination: presentations

Examples of program evaluation

Formative: After each didactic lecture of the ambulatory rotation, learners completed an evaluation form. It was discovered that students had already learned about STDs in GYN, so the lecture was replaced.

Summative: Summative evaluation of the pilot clinical skills program for medical students showed a high level of satisfaction and learner proficiency, so the curricular dean sought resources and time to expand the program

Evaluation Questions/Designs

- Most of the evaluation questions should relate to specific measurable curricular objectives for the learner, process or outcome
- It is helpful to include some questionnaire items that do not relate to specific objectives and are open-ended in nature to detect unexpected strengths and weaknesses in the curriculum.

Curriculum Evaluation

Identify likely users of evaluation –

- Participants: learners, faculty and curriculum developers
- Dean's office, department chair, program director for residency or medical student education, division director
- Any granting agencies or others who have supported the curriculum

Curriculum Maintenance and Enhancement

- A successful curriculum is continually developing
- Understanding, sustenance and management of change is required to maintain strengths and promote further improvements

Evaluation Designs

Rating forms	C, A, P
Self-assessment forms	C, A, P
Essays on respondent's experiences	A
Written or computer examinations	C
Oral examinations	C, A
Questionnaires	A
Individual or Group interviews	A
Direct observation	Skill
Performance audits	Skill

Potential Ethical Concerns

- Concerns about confidentiality of evaluator, access and consent for evaluations
- Fairness of resource allocations
- Impact of Evaluation
  - Individual evaluations that are insufficiently accurate for summative evaluation
  - Inability to conduct an accurate summative program evaluation

Evaluation

- Collect data
  - Attention to response rates, efficiency
  - Data instrument design will be effected by process of data collection – need instrument appropriate for time and resources
  - Assign someone to pursue nonresponders
- Analyze data
  - Will defer talk about parametric vs nonparametric data, statistics
- Create report

Curriculum Maintenance and Enhancement

A successful curriculum must respond to:

- Evaluation and feedback
- Changes in knowledge base and material requiring mastery
- Changes in resources including faculty
- Changes in targeted learners
- Changes in institutional and societal needs and values

Areas for assessment and Potential Change of a Curriculum

- Written or intended curriculum – goals and objectives, content, materials, methods
- Environment / setting – space, equipment, supplies, clinical experience, learning climate
- Administration – scheduling, preparation or materials, handling of evaluation materials
- Faculty – reliability, accessibility, skills
- Learners – achievement of objectives, satisfaction, involvement, application/transfer

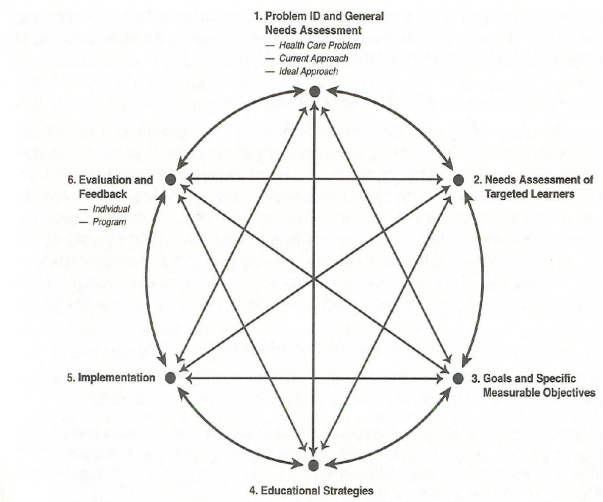
Methods of Assessing how a Curriculum is Functioning

- Program evaluation
- Learner/faculty/staff/pt questionnaires
- Objective measures of skills and knowledge
- Focus groups of learners, faculty, staff
- Regular meetings
- Special retreats and strategic planning sessions
- Site visits
- Informal observation / discussions

Curriculum Dissemination Reasons

- Help address a health problem
- Stimulate change
- Seek external feedback
- Increase interchange and collaboration
- Minimize redundant work
- Help curriculum developers achieve recognition and academic advancement

Thank you! - Questions?



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