7 Curriculum Development

LEARNING OUTCOMES

After reading this chapter, you should be able to

1. Explain the various procedures of curriculum development in the technical-scientific approach and apply the specific steps to create a general curriculum plan
2. Describe the various nontechnical-nonscientific approaches to curriculum development
3. Explain how one might enact a curriculum development process
4. Identify and explain the various participants who should be involved in the curriculum development process or processes

Education and schooling have a troubled relationship, making it necessary for educators, teachers especially, to reflect on just what each concept represents. Hidden within these concepts are knowing and understanding. Also, there is this question: Does school contribute to or hinder students' education? This question has a long history. Ever since compulsory public school began in the 19th century, groups have queried whether schools possessed the capacity to educate.[1] We are not going to answer this question definitively. However, we do believe that the school's function is to educate, not to mold students who just regurgitate information or perform mindless skills.

As Ken Osborne asserts, in a democracy, students must realize that dialogue is central to democratic participation. Students need deep knowledge to debate myriad viewpoints; students must relish interacting with individuals with opposing views; students must attain capacities to process opinion into action.[2] But to be skilled in meaningful dialogue, students must develop critical thinking within acute issues facing them in the 21st century. As Nodding asserts, we still tend to believe that critical thinking can be taught as an intellectual skill apart from particular topics and issues.[3] Or, as Doll posits, many educators believe that a teacher can "give" students the steps of critical thinking, which they can then apply. But as Doll further states, thinking is different from learning. One can learn, be given, the steps involved in thinking, a formula that they can just apply as need arises. But that is just applying a "given," an approach that is accepted by the students, not owned or internalized.[4]

Education in the 21st century exists in a sea of unique complexity. Education and/or training appropriate in the 20th century is/are no longer adequate for the 21st. While education in the last century fostered a rugged individualism and perpetuated the myth that people could succeed on their own, this new century requires a need for skills in collaboration and recognizing and appreciating interdependence at myriad levels of human engagement.[5]

Education, in contrast to schooling, enables students to become individuals with intellectual character. As Ron Ritchhart queries, "Why would we be teaching a curriculum if not for intelligence?"[6] Schooling tends to indoctrinate. Education strives to liberate. Schooling tends to stress efficiency and standardization. Education endeavors to be messy and spontaneous. Schooling attempts to fill students with knowledge. Education tries to make students utilize knowledge in thinking and to become intelligent utilizers of information. Education fosters intellectual character in students.[7] Doll notes that in our striving to make students thinking individuals, we sometimes give students too much regarding thinking processes. We make students receivers of process, passive learners, rather than actors in their own learning, active learners. Doll stresses that learning is not repeating verbatim what is read or heard. Rather, learning results from students actively engaged in rethinking details read or presented and rearranging such data so as to develop insights to which they can claim ownership.[8] Curriculum development needs to be designed such that students have ample opportunities for discovery play. Students need to have presented many ports from which they can initiate voyages to the unknown.[9]

To educate so that students are the main actors in their learning requires educators to engage in serious curriculum development. A curriculum, especially in this technological century, is more than a school board–approved textbook series. As noted by Michael C. McKenna, we are well into a "brave new world of technology."[10] This new world with ever-expanding information technologies has added complexities to what it means to be literate, to manage one's education. He notes that the speed of new technologies demands that those planning curriculum consider the inclusion of new student skills and strategies.[11] In this 21st century, we educators and curriculum developers are also challenged to be active students of education and learning.

We do not suggest that teachers disregard textbooks and other educational materials. However, textbooks and related materials provide only a suggested curriculum. Teachers must still make informed decisions about the purposes of learning certain information, what content to stress, what materials to emphasize, and how to sequence such materials. Further, teachers must decide what instructional strategies to use and what student activities are essential and appropriate for diverse class members. Also, teachers must select various assessment instruments and processes to support their teaching and students' learnings.

Curriculum development is not static. It draws on emerging views of modernism and postmodernism, new understandings of cognitive theories, new understandings of the anatomy and physiology of the brain, and new formulations of instructional design and systems theory. The melding of thought regarding the various world and educational philosophies is also having an impact on curriculum development.

There are various ways to define curriculum development. Also, different curriculum designs take subject matter, students, and society into account to differing degrees. Curriculum development consists of various processes (technical, humanistic, and artistic) that allow schools and schoolpeople to realize certain educational goals. Ideally, everyone affected by a curriculum is involved in its development.

A useful way to reflect on curriculum development is to think of it as a variety of games with myriad rules. Allan Garrett makes a case for the ecology of games metaphor when he states that it "provides an elegant and useful framework for the consideration of the various parties that seek to influence American public education."[12] Garrett notes that Norton E. Long first introduced studying local communities as ecologies of games.[13]

Looking at curriculum development as a series of games engaged in by various educators, teachers, curricularists, administrators, and even, at times, groups from the general public assists us in realizing that people have varied goals for playing the game or games. Employing the game

mentality, there are winners and losers, although we should strive for the curriculum game as a win-win.

In the curriculum-development game, there are players who collaborate for diverse and particular ends. Many teachers may share particular ends—that is, to have students "win" the game of really learning the curriculum developed and implemented—whereas some teachers, especially in districts advocating merit pay for "successful" teaching, might aim at advancing themselves on the pay scale. Administrators might play the game to have their schools attain state and national standards. School board members might strive to get reelected. Legislators might engage in the curriculum game to define themselves as "educational" leaders. We can analyze not only how the "many" play the game, but deduce their rationales for playing and the criteria they use for success. And some players might be participating in related and parallel games. Individuals might use others for their own benefits. Garrett posits that legislators might argue for better schools and curricula solely to win public support for their particular agendas.

Some players are engaged in Race to the Top to gain funding for novel ideas regarding education in general and curriculum in particular. Some play for pride, for praise, or for attainment; but all play for a purpose. They play for success! Currently, *success* has a plethora of meanings: attaining standards, liberating minds, indoctrinating, opening intellectual horizons, scoring high on tests, knowing the mores of particular cultures, and so on. Although many players are multitasking in their games, most center their play on a particular game—in our discussion, on playing curriculum development. And most curriculum players play the game from a technical, nontechnical, or holistic model.

Many social and educational critics believe that society has been moving from modernism (which stresses the technical, precise, and certain) to postmodernism (which stresses the nontechnical, emergent, and uncertain). Modernism has also been labeled constructivism; postmodernism has been described as postconstructivist. While modernism is still dominant in most educators and the public's view, postmodernism emerged in the latter part of the 20th century. Because postmodernism is relatively new, we have more technical than nontechnical curriculum models on which to draw. People who believe in a curriculum design that stresses subject matter usually favor technical approaches to curriculum development. People who focus on the learner often prefer a nontechnical approach. People who consider the curriculum a vehicle for addressing social problems can favor either approach. Certainly, as Doll asserts, adjusting one's thinking and conceptions from modern to postmodern cannot be done in just a few decades. Humans accommodate change to new processes of thinking and meaning-making slowly. Systems breaks such as postmodern approaches frequently are resisted in the early stages. But we believe, along with Doll, that these new ways of viewing and reasoning eventually will meld into our cognitive approaches to evolving realities.[14] We suggest that you the reader try to view what you read about curriculum development as if wearing glasses that allow you to experience both modern and postmodern postures. Read with certainty; reflect with uncertainty and doubt. Reflect with awe about the dynamics of reality. Life does not stand still; individuals live and act in evolving "nows." Learning results in myriad layers of understandings and doubts. The following sections dealing with approaches to curriculum development should be considered as algorithms, not precise formulas for creating curricula. These are procedures that embrace educational visions "built on doubt not certainty."[15]

TECHNICAL-SCIENTIFIC APPROACH (MODERNIST PERSPECTIVE)

The technical-scientific approach to education and curriculum stresses students learning specific subject matter with specific outputs. Curriculum development is a plan for structuring the learning environment and coordinating personnel, materials, and equipment. The approach applies scientific principles and involves detailed monitoring of the components of curriculum design.[16] Curriculum is viewed as a complex unity of parts organized to foster learning.

Educators who use a technical-scientific approach attempt to systematically outline those procedures that facilitate curriculum development. The various models use a means-end paradigm that suggests that the more rigorous the means, the more likely the desired ends will be attained. Followers of this approach indicate that such a systematically designed program can be evaluated. However, others question just how precise the evaluation can be.

The various technical-scientific models exhibit what James Macdonald called a "technological" rationality, as opposed to an "aesthetic rationality."[17] People who favor technical-scientific models prioritize knowledge acquisition and an educational system that is maximally efficient.

Technical-scientific curriculum development began around 1900, when educators sought to apply empirical methods (surveys and analysis of human conduct) to the question of curriculum content. The push for a science of curriculum making accompanied the rise of biology, physics, and chemistry as well as the use of the "machine theory" evolving in business and industry.

The Models of Bobbitt and Charters

Franklin Bobbitt compared creating a curriculum to constructing a railroad: Once the general route is planned, the builder engages in surveying and then the laying of track. Developing a curriculum is like planning a person's route to growth, culture, and that individual's special abilities.[18] Like a railroad engineer, an educator must "take a broad over-view of the entire field [and see] the major factors in perspective and in relation." A general plan for the educational program can then be formulated, followed by "determining content and experiences necessary for the [learner]."[19] Even today, many educators believe that curriculum development must include some means of monitoring and managing learning; that is, students' interactions with specific contents. Such monitoring enables an effective structure of curriculum and instruction.[20]

For Bobbitt, the first task of curriculum development is to "discover the activities which ought to make up the lives of students and along with these, the abilities and personal qualities necessary for proper performance."[21] Bobbitt believed that education in the new 20th century had to strive to develop a type of wisdom that could result only by participating in actual life situations. Such situations would nurture in students' specific judgments and thought.[22] Education's purpose was to prepare students effectively to be competent participants in life, particularly to engage in specific activities that would contribute to society, the economy, and family life. He argued in his writings that prior to the 20th century, creating curricula, creating educational opportunities, was not carefully thought through. To create a meaningful educational experience, we needed a scientific technique to determine curricula requisite for educating students in specific activities necessary for a productive life that contributed to the overall society.[23] All human experiences needed to be considered when contemplating developing curricula. What Bobbitt advocated still has value today. This approach continues in various types of task analysis.[24] It shares features of what some educators call *backward design*.[25]

Bobbitt's contemporary Werrett Charters also believed in activity analysis. However, Charters noted that "changes in the curriculum are always preceded by modifications in our conception of the aim of education."[26] Our aims (ideals) influence the selection of school content and experiences. Charters wanted educators to connect aims with activities that individuals performed. He advocated four steps of curriculum construction: "(1) selecting objectives, (2) dividing them into ideals and activities, (3) analyzing them to the limits of working units, and (4) collecting methods of achievement."[27]

For Charters, philosophy supplied the ideals that were to serve as objectives and standards. He noted that the curriculum could contain both primary and derived subjects. *Primary subjects* were those directly required by a particular occupation. For example, a meteorologist must fill out various types of reports. Therefore, report writing is a primary subject for all students to experience in English classes. Meteorology requires a knowledge of physics and mathematics, which are *derived subjects,* "service subjects which are important not because they are directly

useful in the performance of activities, but because they are derived from material which has practical service value."[28]

Bobbitt and Charters firmly established scientific curriculum making. They saw effective curriculum development as a process that results in a meaningful program. Bobbitt and Charters initiated a concern for the relationships among goals, objectives, and activities. They regarded goal selection as a normative process and the selection of objectives and activities as empirical and scientific. Bobbitt and Charters indicated that curricular activity can be planned and systematically studied and evaluated.

The field of curriculum achieved independent status with the 1932 establishment of the Society for Curriculum Study. In 1938, Teachers College at Columbia University established a department of curriculum and teaching. For the next 20 years, Teachers College dominated the field of curriculum; its influence even surpassed the earlier influence of the University of Chicago.

The Tyler Model: Four Basic Principles

Ralph Tyler's technical-scientific model is one of the best known. In 1949, Tyler published *Basic Principles of Curriculum and Instruction*, in which he outlined an approach to curriculum and instruction.[29] Those involved in curriculum inquiry must try to (1) determine the school's purposes, (2) identify educational experiences related to those purposes, (3) ascertain how the experiences are organized, and (4) evaluate the purposes.

By *purposes,* Tyler meant general objectives. He indicated that curriculum planners should identify these objectives by gathering data from the subject matter, the learners, and the society. After identifying numerous general objectives, the curriculum planners were to refine them by filtering them through the school's philosophy and the psychology of learning. Specific instructional objectives would result.

Tyler discussed how to select educational experiences that allow the attainment of objectives. Learning experiences had to take into account learners' perceptions and previous experience. Also, they were to be selected in light of knowledge about learning and human development. Tyler addressed the organization and sequencing of these experiences. He believed that the sequencing had to be somewhat systematic to produce a maximum cumulative effect. He thought that ideas, concepts, values, and skills should be woven into the curriculum fabric. These key elements could link different subjects and learning experiences. Tyler's last principle deals with evaluating plans and actions. Tyler believed that evaluation was important in determining whether a program was effective.

Although Tyler did not display his model of curriculum development graphically, several other people have. Our diagram of this model appears in Figure 7.1.

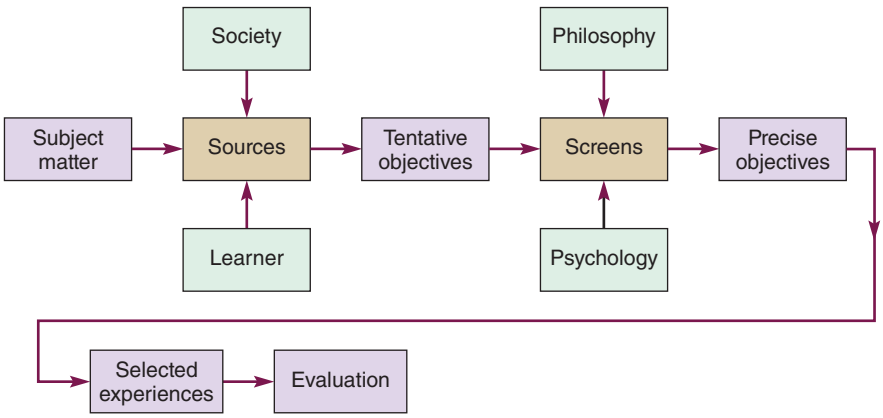

FIGURE 7.1 Tyler's Curriculum Development Model

Some people have criticized Tyler's approach as too linear, too reliant on objectivity, and somewhat based on assumptions about cause and effect; it allows all educational experiences to be justified by the objectives that they address. Nevertheless, Tyler's approach to curriculum development remains popular with school district personnel and still influences universities. Its reasonableness and workability appeal to many people. Tyler's approach works regardless of context or one's philosophical orientation.[30]

The Taba Model: Grassroots Rationale

Hilda Taba was an influential colleague of Tyler's. In *Curriculum Development: Theory and Practice* (1962), she argued that there was a definite order to creating a thoughtful, dynamic curriculum.[31] Unlike Tyler, Taba believed that teachers should participate in developing curricula. She advocated what has been called the *grassroots approach*,[32] a model whose steps resemble Tyler's. Although Tyler did not advocate that his model be used only by people in the central office, educators during the early days of curriculum making thought that the central authorities had the knowledge to create curricula. They subscribed to a top-down (administrative) model. Frequently, administrators gave teachers ideas from curriculum experts and then supervised the teachers to ensure that the ideas were implemented. In contrast, Taba believed that a curriculum should be designed by its users. Teachers should begin by creating specific teaching-learning units for their students and then build to a general design. Taba advocated an inductive approach rather than the more traditional deductive approach of starting with a general design and working toward specifics.

Taba's grassroots model entails seven major steps:

1. *Diagnosis of needs.* The teacher (curriculum designer) identifies the needs of the students for whom the curriculum is being planned (see Curriculum Tips 7.1).
2. *Formulation of objectives.* The teacher specifies objectives.
3. *Selection of content.* The objectives suggest the curriculum's content. The objectives and content should match. The content's validity and significance also are determined.
4. *Organization of content.* The teacher organizes the content into a sequence, taking into consideration learners' maturity, academic achievement, and interests.
5. *Selection of learning experiences.* The teacher selects instructional methods that engage the students with the content.
6. *Organization of learning activities.* The teacher organizes the learning activities into a sequence, often determined by the content. The teacher must bear in mind the particular students who will be taught.
7. *Evaluation and means of evaluation.* The curriculum planner determines which objectives have been accomplished. Students and teachers must consider evaluation procedures.

CURRICULUM TIPS 7.1 Conducting a Needs Analysis

1. Set aside time and designate people who will conduct the needs analysis.
2. Create or obtain data gathering instruments and schedule time to gather data (for example, through surveys, town meetings, questionnaires, tests, and interviews).
3. List the curriculum's aims and goals.
4. Match the aims and goals.
5. Identify gaps between desired and actual results.
6. Decide which gaps require immediate curricular attention.
7. Suggest ways to address the identified gaps.

Source: Adapted from Abbie Brown and Timothy D. Green, *The Essentials of Instructional Design* (Upper Saddle River, NJ: Pearson, 2006), p. 97.

Taba was far ahead of her time. Most of today's curriculum designers still follow steps 1, 2, 5, 6, and 7. They first examine the extant situation, analyzing the learners and their needs (Taba's step 1). They then develop instructional goals and objectives (Taba's step 2). Third, they organize instruction and create learning environments (Taba's steps 5 and 6), selecting learning experiences and organizing learning activities. Finally, they evaluate the learners and the instructional program's overall success (Taba's step 7).

The Backward-Design Model

Another popular model of curriculum development is the "backward design" advocated by Grant Wiggins and Jay McTighe.[33] Essentially, this model is a variation of task analysis. Its roots can be traced back to Bobbitt and Charters. It also draws from the fields of architecture and engineering.

Backward design (we prefer to call it *backward development*) begins with a statement of desired results. Just what do you want to accomplish? What should students know and be able to do? What values and attitudes should they have? What skills should they possess and be able to demonstrate? Essentially, this first stage involves identifying the school program's goals.

Wiggins and McTighe specify three levels of decision making in this first stage. At the first and most general level, an educator considers goals and checks on national, state, and local content standards. At the second level of decision making, curriculum developers (including classroom teachers) select content—valuable information and skills that might lead students to the desired results. What basic understandings and skills do students need in light of stated standards, community expectations, and research results? What generalizations, concepts, and facts must students master in order to achieve? What procedures, methods of analysis, and thinking strategies must students experience to become self-learners?

The final level of decision making in this first general stage involves narrowing the content possibilities. What specific courses will be taught, and what particular content (both declarative and procedural)? Wiggins and McTighe refer to this final level of decision making as identifying enduring understanding that anchors the unit or course. "The term enduring refers to the big ideas, the important understandings, that we want students to 'get inside of' and retain after they've forgotten many of the details."[34]

Stage 2 of the backward-design model involves determining how the curriculum will be evaluated once it is in place. How will we know whether students have met the set standards? What evidence will be collected to assess the curriculum's effectiveness? According to Wiggins and McTighe, the backward-design model gets teachers thinking like assessors before they develop curriculum units and lessons. Wiggins and McTighe suggest various assessment methods that can be considered at this stage, including informal checks, observations of students, dialogue with students, quizzes and tests, and performance tasks and projects.[35]

When educators have clearly identified the curriculum's goals and determined how to assess the extent to which those goals have been reached, they are ready to plan instructional activities. Wiggins and McTighe list several key questions that curriculum developers and teachers must raise at this stage:

> What knowledge and skills do students need to succeed in the course?
>
> What activities enable students to master the requisite knowledge and skills?
>
> What should be taught, and how should it be taught, for students to become knowledgeable and skillful in the identified content realm?
>
> What materials foster student success in the curriculum?
>
> Does the overall design of the course or unit fulfill the principles of curriculum development?

Figure 7.2 shows a variation of Wiggins and McTighe's backward-design model.

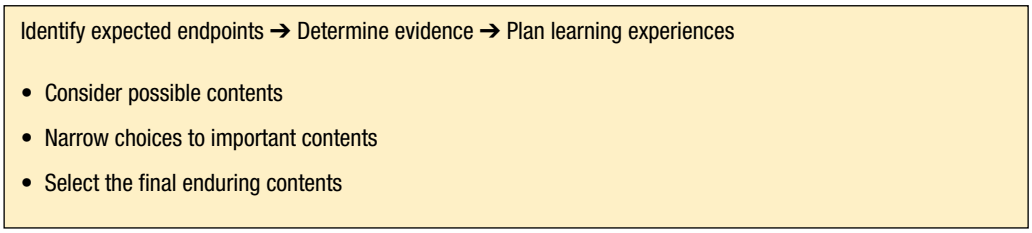

FIGURE 7.2 Backward-Design Model

The Task-Analysis Model

7.1 Backward Design
Backward Design is a way to plan curriculum with the end, or goal, in mind. Watch as this short video "illustrates" this idea. How might a teacher use backward design to plan a unit on a subject like the Civil War or the U.S. Constitution?

https://www.youtube.com/watch?v=3Xzi2cm9WTg

Task-analysis models differ widely. However, they all share a focus on identifying essential content and skills, which are determined by analyzing the tasks necessary for school learning or some real-world task.[36] Basically, there are two types of task analysis: subject-matter analysis and learning analysis.

SUBJECT-MATTER ANALYSIS. *Subject matter,* or *content,* is the starting point in subject-matter analysis. The key question is, What knowledge is most important for students? We usually ask this question of subject-matter experts. Ideally, these experts are the educators responsible for creating and teaching the curriculum. However, we can draw on the expertise of scholars in various disciplines. When the curriculum is intended to prepare people for certain professions, then the question is, What subject matter enables students to perform the tasks of particular jobs within those professions?[37]

Subject matter must be broken into parts. Consider the subject of government. Students must understand the general concepts *government* and *citizen,* but also the narrower concepts of *representative government* and *citizen responsibility*. They must also know certain facts, such as the number of branches of government and the dates when amendments to the U.S. Constitution were passed. Breaking down knowledge of government requires giving that knowledge realm some structure. One way to do this is to use a master design chart.

A master design chart uses information gained from experts in the subject matter. This information covers important facts, concepts, rules, laws, generalizations, theories, and so on. Essentially, the master design chart contains the topics and related information to be learned in a certain course or a total curriculum. One way to design the chart is to create a row for each crucial topic and a column for the degrees of emphasis that topics will receive. One also could indicate the various learning behaviors that students must exhibit regarding each topic: concepts, generalizations, and so on. Figure 7.3 provides a sample master design chart.

Someone reading about a master design chart might think that it is the same as a curriculum map. There are similarities. However, curriculum maps deal with content topics to be covered, but not how they are to be experienced. Also, curriculum maps are generated primarily by teachers scheduled to teach the curriculum.[38]

Once the chart has been completed, it is necessary to identify the relationships among the content topics, concepts, generalizations, and so on. In determining the relationships, we reflect on how to construct the curriculum unit so that the content has a meaningful organization. The content can be organized chronologically, according to the specific content's knowledge structure, in the order in which it might be used, or according to the manner in which psychologists indicate students might best learn it.

LEARNING ANALYSIS. Ideally, learning analysis begins when content is being organized. It encompasses activity analysis and addresses which learning processes are required for students to learn the selected content. What activities might students engage in to learn the content and

Content		KNOW			ANALYZE		APPLY	EVALUATE	
		State Facts	Explain Concepts	Present Generalizations	Deconstruct Concepts	Determine Relationships	Do Fieldwork to Gather Data	Determine Accuracy of Field Data	Judge Validity of Conclusion
Land Forms	Mountains	3	2	2	2	2	0	0	0
	Hills	3	2	2	2	2	1	1	1
	Plateaus	3	2	2	2	1	0	0	0
	Plains	3	2	2	2	1	1	1	1
Water Bodies	Oceans	3	2	2	2	2	1	0	0
	Lakes	3	1	1	0	0	0	0	0
	Rivers	3	2	2	2	1	0	0	0
	Seas	3	1	1	0	0	0	0	0

Numbers show level of emphasis given to content and activities.
3 = Heavy emphasis
2 = Major emphasis
1 = Minor emphasis
0 = Mention but no emphasis
— = No mention

FIGURE 7.3 Master Design Chart (for Geography)

master some problem-solving process? It is helpful to consult experts in instructional design and psychology, especially cognitive psychology and brain research.

Learning analysis addresses the sequence of the learning activities. Is there an optimal time line for learning certain content and skills? What should the learner do to gain competence in the skill or content? At this stage, the learning analyst selects instructional approaches that move students toward the curriculum's goals.

Until recently, curricularists had to rely on the research results of cognitive psychology to accomplish learning analysis. The brain was essentially a "black box," about which we inferred how the brain developed and processed learning. Now, with recent brain research, learning analysis can be more precise. Recent discoveries about brain functioning and networking enable us to determine with greater precision those curricular contents and experiences that foster learning.[39]

In the next stage of learning analysis, the curriculum developer creates a master curriculum plan that synthesizes the information obtained and organized through the selection of subject content and learning approaches. Those who have been involved in the task analysis determine the plan's format.

The curriculum team studies the selected content and determines specific objectives with regard to that content. The objectives deal with the cognitive, affective, and (sometimes) psychomotor domains. The sequence of the objectives is linked to the sequence of the selected content and learning activities. The master plan also can indicate educational materials and evaluation methods. Figure 7.4 illustrates the format for a master plan.

In the actual employ of task analysis, subject-matter analysis and learning analysis are often melded. Frequently, the procedural steps are not clear cut. One hybrid type of task analysis might be called gap analysis.[40] Here the focus is to identify gaps in subject matter or in the learning of subject matter. What content are we neglecting? And if we are not neglecting any significant content, do our students have deficiencies in the learning of such content? The deficiencies are not just limited to learnings. Attention can be directed to thinking processes, work habits, skills, even educational experiences. Mary Moss Brown and Alisa Berger even suggest that we may wish as educators to analyze if students in school have gaps or differences with family beliefs and goals.[41]

OBJECTIVES	CONTENT/SUBJECT MATTER	LEARNING/ACTIVITY/ INSTRUCTIONAL APPROACH	MATERIALS/ EVALUATION METHODS

FIGURE 7.4 Master Plan Format

Somewhat related to task analysis is investigating other educational institutions' approaches to program design and curriculum development. We educators can learn much from talking with colleagues, sharing ideas and ways of addressing similar educational and social challenges. Focus on schools that confront problems similar to yours. What procedural steps are they utilizing? How successful have they been in their actions?[42]

We are sure that other technical-scientific models exist or will be generated. Most likely, their creators will be in the traditional philosophical and technological camps. However, people attached to any design orientation can use these models when developing a curriculum.

NONTECHNICAL-NONSCIENTIFIC APPROACH (POSTMODERNIST, POSTCONSTRUCTIVIST PERSPECTIVE)

The technical-scientific approach to curriculum development suggests that the process of curriculum development is highly objective, universal, and logical. It rests on an assumption that reality can be defined and represented in symbolic form. Knowledge can exist as a matter of fact, unaffected by the process of creating and learning it. The aims of education can be specified and addressed in linear fashion. The technical-scientific approach to curriculum development is modernist; it rests on a belief in rationality, objectivity, and certainty. This certainty applies to its foundational assumptions and its methods. The modernist approach eschews doubt or questioning.[43]

In contrast, nontechnical curriculum developers, also known as postmodern or postconstructivist, stress the subjective, personal, aesthetic, heuristic, spiritual, social, and transactional. Curriculum specialists and generalists in this camp draw their basic assumptions regarding the totality of their actions as being complex and turbulent, as having an "orderly disorder."[44] Doll identifies some orderly disorder examples: "avalanches, economic systems, evolutionary development, human bodily and social systems, and population dynamics."[45] We would include in this list educational systems, which include curriculum development.

Few would argue that we do not live in a complex world. Indeed, scientists in quantum physics report that we on Earth are a minute system within an ever-expanding complex universe. Even individuals well established in the modern camp do not deny the complexities of our time. But, as Doll notes, modernists strive to circumscribe complexities so as to increase probabilities of managing them.[46] Postmodern, nontechnical curricularists celebrate the complexities, recognizing that within the educational organization, there is a "dynamical self-organizing process within which we are embedded, embodied, emboldened."[47] Players in the postmodern theater are in perpetual motions of reorganizing and changing. Doll notes that there is a fluidity to their thinking and actions.[48]

Postmodern educators and curricularists also have an expansiveness to their conjectures and endeavors. Curricular topics and pedagogical strategies represent expanding universes of educational discourses. Content concerns are not narrow and traditional. Rather the educational

universe has expanded to "understanding . . . cultural, historical, political, ecological, aesthetic, theological and autobiographical impacts of the curriculum on the human condition, social structures, and the exosphere."[49]

In this approach to curriculum development, the learner is the central focus, not the learner's output of inert information. Students are always evolving. They are active participants in the learning process, not passive recipients of knowledge. Resulting curricula relate to various contexts. Contents are not value-neutral.[50] Those favoring a nontechnical-nonscientific approach note that not all educational goals can be known. Even when the goals appear to be obtained, there are many layers of knowing still hidden in the reporting of success. Key to this approach is accepting the evolutionary nature of curriculum development. Precise procedures are an illusion.

Nontechnical curriculum developers prioritize learners over subject matter. Tentatively selected subject matter has importance only to the degree that students find it meaningful. It should provide opportunities for reflection and critique and should engage students in the creation of meaning.[51] To nontechnical curriculum developers, learning is holistic; it cannot be broken into discrete parts or steps. Instead of developing curricula prior to students' arrival in school, teachers are students' colearners. Teachers and students engage in an educational conversation about topics of mutual interest and concern. In many nontechnical models, the curriculum evolves from teacher–pupil interaction.

Nontechnical-nonscientific curriculum developers are likely to favor child-centered and, to a lesser extent, problem-centered designs. However, they can still take a somewhat systematic approach.

The Deliberation Model

In the deliberation model of nontechnical curriculum development, educators communicate their views to their colleagues and sometimes to students regarding education's goals and what should be taught. However, curriculum development is nonlinear. A blend of modernism and postmodernism, the deliberation approach draws on systems thinking and on feedback and adjustments but also takes into account that reality is somewhat subjective.

Dillon notes that deliberation essentially proceeds from problem to proposals to solution.[52] This process occurs within a recognized socially constructed context. People are aware of the participants in the process and of their views, ideas, and agendas.

Curriculum development through deliberation occurs within cultural contexts. Currently, this is one of the challenges confronting curriculum creators. How can one generate solid curricula while taking diverse cultures, customs, and values into account?

The deliberation model has six stages, as suggested by Noye: (1) public sharing, (2) highlighting agreement and disagreement, (3) explaining positions, (4) highlighting changes in position, (5) negotiating points of agreement, and (6) adopting a decision.[53]

In the first stage, public sharing, people come together to share ideas related to curriculum development. The participants advocate various agendas, which may be in conflict. They express their views regarding the curriculum's nature and purpose, make suggestions and demands, propose particular contents and pedagogies, and identify information that they consider relevant to creating curricula. People discuss their visions of students' roles, optimal learning environments, and teachers' proper functions. At the conclusion of this stage, to which the group can return at any time, the group should record a summary of its thoughts expressed throughout this stage on the common places of content, student, teacher, and school and the challenges confronting the group. The group is now ready for stage 2, highlighting agreements and disagreements.

In stage 2, the group identifies agreements and disagreements regarding educational goals, curriculum content, and instructional approach. All views should be respectfully considered.

In stage 3, group members explain their positions. Why do I think this is a problem? What data support my view? Is a particular group of students failing? What is the curricular solution? To arrive at a consensus, group members must appreciate one another as professionals and not

consider their colleagues to be adversaries.[54] The group leader must have considerable skill in guiding groups.

Stage 4 of deliberation evolves from the activity of explaining positions. Group members change their opinions in response to presented data and arguments. When people change their minds, they inform other group members.

In stage 5 of the deliberative process, participants work toward agreement regarding curriculum content, instructional approaches, and educational goals. In other words, they negotiate and persuade (or become persuaded). Roger Soder argues that persuasion is a critical function of leadership. It relies on appeals to reason and emotion.[55] In stage 5, the group seeks to identify possible curricular solutions to educational needs.

In stage 6, the group achieves consensus regarding the curriculum's nature and purpose. It specifies curricular topics, pedagogy, educational material, school environment, methods of implementation, and assessment methods. The agreed-on curriculum reflects the group's social, political, and philosophical composition. Of course, some uncertainty remains.

We include the postmodernist, postconstructivist perspectives under the nontechnical-nonscientific approach division. The reader should not interpret the placement of this approach or cluster of approaches to curriculum development as being without form. What distinguishes these curricular creation stances is that doubt and constant questioning accompany one's specific behaviors.[56] Persons in this camp do not deny that there can be certainty, but they note that certainty is fleeting, influenced by the situations within which one finds himself or herself.[57] Or as Wolff-Michael Roth posits, "We live within the streaming, mutual life of the universe."[58] Everything in our world and our universe is in motion, and this motion is unidirectional. We cannot stop time; we cannot reverse time. And we can only comprehend time and events after we have experienced them.[59]

Postmodern curriculum developers do not begin curriculum creation with precise directions or endpoints as destinations; rather, goals denote directions. While this seems novel and new, Alfred Whitehead, as noted in Doll,[60] early in the 20th century encouraged educators to realize this fact. Also, he noted that in following various directions, ideas presented in the classroom should be investigated, questioned, from myriad frames of reference. What is tentatively planned leaves "space" for the novel to appear. What is hidden within the tentative curricular plan are temptations that will encourage "creativity, inquiry, innovation, and social responsibility."[61] Such curricular plans are enticements for improvisational theater. A situation is sketched roughly, but the dialogue occurs only when the "actors," students and teacher, experience the suggested encounter or encounters. On another day, that same situation might elicit an entirely different "play" triggering an entirely divergent richness of multiple inquiries and tentative understandings. These tentative events represent what Bakhtin notes as "once-occurrent" that can "only be participatively experienced and lived through."[62]

One might consider this approach to curriculum development as suggesting opportunities for thrill seeking, allowing students to take leaps of faith, to take actions despite their fears and insecurities. Embedded in this approach to curriculum development is a fostering of a playfulness with educational theater. Students and their teachers are urged to become explorers of various intellectual regions. Learning is not solitary; it is a communal cluster of engagements. Students develop relationships with fellow scholars. They have an environment rich in possibilities for developing insights, challenging tentative conclusions. They have time to savor the joy of discovery, realizing that discovery is fleeting; "scholarly talk" must be continuous.

Certainly, educators who develop postmodern, postconstructivist curricula do write down comments, suggestions, and, we would argue, some intuitive sense of what minimal student learnings will result from experiencing said curriculum. But, all layers, permutations of learnings, will not be possible to list, and need not be. And, as time flows, various learnings will be enhanced, modified, and even diminished and lost. But, the precise steps so prominent in the modernist camp are absent in the postmodernist, postconstructivist camp. Rather, curricularists in this "camp" seem to present dispositions to actions that may result in diverse and emergent learnings.

Slattery's Approach to Curriculum Development

Patrick Slattery in his book *Curriculum Development in the Postmodern Era* really avoids precise steps to follow in creating curricula. But he does present some guiding principles for what he states is "an integrated global and local vision for curriculum development in the postmodern era."[63]

Slattery's first guiding principle states that educators need to accept that education is capable of reconceptualizing that very concept of schooling globally and locally. Further, educators must respect the uniqueness of each individual student and recognize the myriad relationships of the totality of each student's experiences. Essentially, educators must be aware of complexity theory and chaos theory.

His second guiding principle is not a suggestion of a process, but an admonition that followers of postmodern curriculum development must reject all modernist stances regarding curriculum and schooling. Such rejection is necessary in order to nurture "an appropriate postmodern educational experience."[64]

Third, to be in the postmodern camp, one must accept that postmodernism offers "an important emerging approach to understanding curriculum."[65] Furthermore, educators must accept the challenge that the curriculum generates opportunities for students to deal with social and educational plights on a global basis.

Fourth, the curriculum must be studied essentially as "currere" so that educators can arrive at generalizations regarding schooling and its curricula. As Slattery points out, *currere* is a Latin word meaning "to run the racecourse."[66] The word curriculum also has its roots in currere. Currere, as presented by William Pinar, is a procedure by which individuals, educators, can engage in self-study: analyzing their present state, reflecting on their past experiences, and forecasting probable future intellectual stances and actions. It is a procedure by which individuals can better understand themselves so as to become more effective educators. Essentially, the procedure engages an individual in self-analysis and introspection, allowing one to be inner directed in his or her thinking and actions. Slattery stresses that when thinking about currere, we should remember that curriculum development is a process even after it is created. It is not a static phenomenon.

Fifth, curricularists need to realize they need to be not just curriculum developers, but also scholars of curriculum. They must realize that their scholarship requires delving in hermeneutics. In layman's language, hermeneutics refers to the science of interpretation. It is not unique to education. All fields of scholarship have members who study documents interpretatively within their fields and disciplines of study.[67]

Doll's Model of Curriculum Development

William Doll certainly can be grouped with the postmodernist camp. To combat the influence of Tyler's rationale and schema for creating curricula, he suggested "The Four *R*'s" as an alternative of Tyler's guidance. From our curricular stance, which is always in a fluid state, Doll has really not presented an alternative to Tyler's rationale, but rather a cluster of criteria for judging curricula designed to mesh with postmodernism. We purport that these criteria can serve both modern and postmodern approaches to curriculum development. Doll's suggested four *R*'s are "Richness, Recursion, Relations, and Rigor."[68]

Richness is defined as the depth of curricular content and experiences. A curriculum possessing richness presents complex strata of meaning. It offers students opportunities to contemplate varied interpretations to content processed and experiences engaged. Doll notes that a rich curriculum must contain the "'right amount' of indeterminacy, anomaly, inefficiency, chaos, disequilibrium, dissipation, lived experience."[69] Stated another way, richness brings the "flavor" of reality to the curricular experience. As Robert Lake notes, life is not invariable; it is in constant social, political, and environmental flux. Richness in curricula demands of students intellectual investigating, communal discovery. As Lake comments, curricula possessing richness stimulates imagination and requires students to engage in resourceful contemplation and action. No curriculum possessing richness is ever completed. Learning cannot be turned into stone. Richness of

the educational experience stimulates a continuous learning process under the internal control of students.[70]

Recursion is Doll's second *R*. He indicates the concept refers to happening again, which is usually considered with the mathematical process of iteration.[71] However, we refer to, and Doll does indicate agreement with, what Jerome Bruner addressed as the spiral curriculum in his book, *The Process of Education*.[72] Bruner notes that students add richness to their understandings of information and concepts through a process of continuously revisiting or looping back at various thoughts and insights. Each revisit, each re-encounter with the material, allows the learner to add depth and richness to his or her understanding. There is a creative dynamic extant in each iteration with the contents and experiences.

Relations, Doll's third *R*, is essential to a postmodern curriculum in two ways: pedagogical and cultural.[73] Relations deals with the connections, the structural links that shape the curriculum, both its contents and its pedagogical experiences. Relations are actions, not changeless stances. In postmodern thought, the curriculum and its associated actions are always in a state of development, an evolution ongoing. Later, we discuss the structures of disciplines. Modernists present these structures as rigid, with discipline scholars accepting content architecture as agreed upon. But, postmodernists counter that these structures are in dynamic and even chaotic relations of which curricularists should be aware.

Cultural relations, Doll asserts, must be considered when engaged in curricular activities. Educators create educational programs within cultural contexts. Educators must recognize the contextual inherent character of the world theater in which they are creating curricular opportunities. Educators need to realize they must engage others in the conversations requisite for creating meaningful educational programs.[74] Doll urges educators and all peoples "to honor the localness of our perceptions and . . . to realize that our local perspectives integrate into a larger cultural, ecological, cosmic matrix."[75]

Doll's last *R* is *rigor*. Rigor is perhaps the most important of the four *R*'s. Doll here indicates that these four *R*'s are criteria to apply to the process of curriculum development rather than actual steps in creating postmodern curricula. We made this point early in this section. Doll denotes that in the modernist stance, rigor possesses the elements of "scholastic logic, scientific observation, and mathematical precision."[76] The postmodern stance necessitates reconceptualizing the concept of rigor. Instead of rigor being a criterion of precision based on logic, observation, and mathematical precision, it encompasses the features of "interpretation and indeterminacy." It draws on the "uncertainty principle" of chaos theory.[77] Nothing said or discovered can be stated with absolute certainty, not even some discovery stated at the 99th percentile of probability.[78]

Accepting this postmodern posture, applying rigor means that even when we create and develop curricula, we are always mindful that there are alternatives to what content and experiences are planned. And additionally, there are myriad relations and arrangements of the contents and experiences. How one conceives of the "tentative" formatted curricular plan will be influenced by the assumptions one brings to the process of curriculum development. Doll reports that these assumptions are often hidden from us, and only revealed upon reflection.[79]

As Howard Gardner asserts, every period of history has its own foremost statements or principals of explanation.[80] The challenge for educators today is to realize that we exist in an evolving and conflicting historical era: modern and postmodern. The modern has been with us since the Enlightenment, which commenced circa the 1700s. The term postmodern can be dated to have begun, not with certainty, in the late 1970s. A French scholar, Jean-François Lyotard, in his book *The Postmodern Condition: A Report on Knowledge* (1984), asserted that the Western world was entering a new era, the postmodern. However, later in the 1980s, he noted that this new era was less a break with the modern than the modern era proceeding to "re-write itself."[81] Today in the 21st century, we are morphing, not discarding modernism, but rewriting it to function in a time of complexity and chaos. Many educators accept the uncertainty principle of quantum mechanics. Many educators, us included, realize that while "objectives" and specific

Table 7.1 | Overview of Curriculum Development Approaches

Approach	Major Assumptions	View of Curriculum	Major Models
Technical-Scientific	Major steps can be identified and managed.	Curriculum is viewed as knowable components selected and organized.	Bobbitt, Charters, Tyler: Procedure
Modernist Perspective	Certainty principle	Curriculum is viewed as a compendium of parts.	Taba: Grassroots rationale
	Curriculum development has a high degree of objectivity, logic.	Curriculum is viewed as engaging students in distinct and meaningful tasks.	Wiggins, McTighe: Backward design
	Curriculum development involves task analysis and draws on separating key points of curriculum from major endpoint to starting point.		Jonassen, Tessmer, Hannum: Task-analysis approach
	Curriculum can be broken into distinct parts or tasks.		
Nontechnical-nonscientific Postmodernist, Postconstructivist Perspective	Curriculum development is subjective, personal, aesthetic, transactional.	Curriculum is viewed as conversation.	The deliberation model
	Curriculum development stresses the heuristic, spiritual, social.	Curriculum is viewed as evolutionary.	Slattery approach
	Curriculum development accepts "orderly disorder."	Curriculum is viewed as a dynamic and uncertain system.	Doll's four *R*'s approach

learnings can be listed on a curriculum plan, there are layers of learnings, both cognitive and affective, that accompany the "attainments" of the learners. We know that, as Lake denotes, "the planned curriculum never trumps the enacted curriculum when imagination is at work."[82] As denoted by Lake, "A curriculum of imagination is not just designated to the confines of school, but embraces the entire life of the learner."[83] A curriculum that incorporates both modern and postmodern stances triggers lifelong learning.

Table 7.1 provides an overview of the technical, modernist, nontechnical, and postmodern approaches to curriculum development.

ENACTING CURRICULUM DEVELOPMENT

Curriculum development essentially draws on two realms of knowledge: curriculum design and instructional design. Especially at the K–12 level, most educators know more about the former than the latter. As Richard Elmore notes, schools continually modify their curricula, but instructional practice seems to change little.[84]

Researchers at Pennsylvania State University's Applied Research Laboratory defined instructional design as "the systematic development of instructional specifications using learning and instructional theory to ensure the quality of instruction."[85] Programs must give more than cursory attention to how new content will be taught and how classroom and school environments