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Social Efficiency Ideology

A Scientific Technique of Curriculum Making

In 1913, Franklin Bobbitt launched the Social Efficiency ideology by demanding that educators learn to use the scientific techniques of production developed by industry (Bobbitt, 1913). In 1918, Bobbitt published *The Curriculum*—the book that marks the birth of the field of curriculum. In it he declared that the educational "task preceding all others is the determination of . . . a scientific technique" of curriculum design (Bobbitt, 1918). He described the underpinning of his scientific technique this way:

> The central theory is simple. Human life, however varied, consists in the performance of specific activities. Education that prepares for life is one that prepares . . . for these specific activities. However numerous and diverse they may be . . . they can be discovered. This requires only that one go out into the world of affairs and discover the particulars of which these affairs consist. These will show the abilities, attitudes, habits, appreciations, and forms of knowledge that men need. These will be the objectives of the curriculum. They will be numerous, definite, and particularized. The curriculum will then be that series of experiences which children and youth must have by way of attaining those objectives . . . that *series of things which children and youth must do and experience* by way of developing abilities to do the things well that make up the affairs of adult life; and to be in all respects what adults should be. (p. 42)

Note here that the "objectives" of education are assumed to be the "numerous, definite, and particularized" "performances" needed "to do the things well that make up the affairs of adult life," and that the curriculum should be the "series of things which children and youth must do and experience" to obtain those performances.

In 1949, Ralph Tyler presented Bobbitt's scientific technique in its broadest form in *Basic Principles of Curriculum and Instruction* by introducing four basic

questions every educator must answer when creating curriculum or instructional programs:

1. What educational purposes should the school seek to attain?
2. What educational experiences can be provided that are likely to attain these purposes?
3. How can these educational experiences be effectively organized?
4. How can we determine whether these purposes are being attained? (p. 1)

Let us briefly examine each of Tyler's questions.

The first question is "What educational purposes should the school seek to attain?" In other words, what educational purposes should a curriculum or instructional program have as its goal? These "educational purposes" are what Bobbitt called the "objectives of the curriculum." Determination of curriculum objectives is the first task for Social Efficiency educators, for as Tyler (1949) says,

> if an educational program is to be planned . . . it is very necessary to have some conception of the goals that are being aimed at. These educational objectives become the criteria by which materials are selected, content is outlined, instructional procedures are developed and tests and examinations are prepared. (p. 3)

During the early stages of curriculum work, Social Efficiency educators devote "much time to the setting up and formulation of objectives, because they are the most critical criteria for guiding all the other activities of the curriculum-maker" (Tyler, 1949, p. 62).

Social Efficiency educators believe curriculum objectives must be stated in behavioral terms: as observable skills, as capabilities for action, as activities people can perform, as demonstrable things people can do. The need to state objectives this way provides several insights into the Social Efficiency ideology. First, the behavioral phrasing of objectives reflects the Social Efficiency conception of the nature of man: the essence of man is expressed in the specific behaviors he can perform. Important here are both the behavioral conception of man and the conception of man as a bundle of specific skills. As Bobbitt wrote, "human life, however varied, consists in the performance of specific activities." Second, the behavioral phrasing of objectives reflects the Social Efficiency conception of the nature of education. As Tyler (1949) wrote, "education is a process of changing the behavior of people. . . . [E]ducational objectives, then, represent the kinds of changes in behavior that an educational institution seeks to bring about in its students" (pp. 5–6). The essence of education can be summed up by the phrase "changing behavior." Third, the behavioral phrasing of curriculum objectives allows them to be stated in a form which facilitates the efficient scientific development of curriculum: a form that "provides clear specifications to indicate just what the educational job is" (p. 62), a form that is "most helpful in selecting learning experiences and in guiding teaching" (p. 44), and a form that makes evaluation easy.

The second question Tyler asks educators creating curriculum or instructional programs is "What educational experiences can be provided that are likely to attain these purposes?" These "educational experiences" of Tyler's are the same as Bobbitt's learning

"experiences which children . . . must have by way of attaining those objectives." The "experiences" from which the child learns comprise the substance of the curriculum and are the means of attaining the ends of the curriculum as defined in its "objectives." Learning experiences have this place in curriculum because it is believed that "for a given objective to be attained, a student must have [learning] experiences that give him an opportunity to practice the kind of behavior implied by the objective" (Tyler, 1949, p. 65). Here, "the term 'learning experience' refers to the interaction between the learner and the external conditions in the environment to which he can react" (p. 63). Two aspects of this concept of learning experiences are crucial. First, "learning takes place through the active behavior of the student; it is what he does that he learns" (p. 63). Second, "learning takes place through the experiences which the learner has; that is, through the reactions he makes to the environment in which he is placed" (p. 63).

From this perspective, both the learner and the learning experiences are crucial. The learner is crucial to the learning process because he "himself must carry on the action which is basic to the experience" from which he learns, for "it is the reactions of the learner himself that determine what is learned" (Tyler, 1949, p. 64). Learning experiences are crucial because the actions and reactions of learners are controlled, molded, or shaped through their interactions with the environment in which they are placed. The significance of this for educators follows directly: they must control the learning experiences students have by "manipulation of the environment in such a way as to set up stimulating situations—situations that will evoke the kind of behavior desired" (p. 64). In particular, they must contrive an educational environment that contains the stimulus conditions that will elicit, stimulate, reinforce, and support the behavior (actions and reactions) desired of learners as specified by their curriculum's objectives.

Note that action that one performs is viewed as different from content stored in the mind. It is the former that is valued and not the latter. Social Efficiency curricula specify behavior that is learned, not content that is acquired.

The third question Tyler presents is "How can these educational experiences be effectively organized?" This is similar to Bobbitt's concern with creating an effective *series* of experiences that children encounter as they run the curriculum.

> In order for educational experiences to produce a cumulative effect, they must be so organized as to reinforce each other. Organization is . . . important . . . in curriculum development because it greatly influences the efficiency of instruction and the degree to which major educational changes are brought about in the learners. (Tyler, 1949, p. 83)

Important here is the word *efficiency.* Effective organization of learning experiences allows curriculum objectives to be efficiently accomplished by stimulating learning to take place in the most efficient manner possible—where efficiency is defined in terms of expenditure of time, money, and human resources.

The fourth question educators must answer is "How can we determine whether these purposes are being attained?" For the Social Efficiency ideology, "the process of evaluation begins with the objectives of the educational program" (Tyler, 1949, p. 110) and "is essentially the process of determining to what extent the educational objectives are actually being realized by the . . . curriculum" (pp. 105–106). Since "educational

objectives are essentially changes in human beings," it follows that "evaluation is the process for determining the degree to which these changes in behavior are actually taking place" (p. 106). Important here is that the behavioral conceptions of man and education, which result in the stating of educational purposes as behavioral objectives, also result in a concept of evaluation limited to the overt behavior of the evaluee and the specific behaviors stated in the educational objectives. And since, as Bobbitt says, "the objectives of the curriculum . . . will be numerous, definite, and particularized," it follows that evaluation will be numerous, definite, and particularized.

In summary, the scientific technique of the Social Efficiency ideology consists of determining "educational purposes," "educational experiences . . . to attain these purposes," effective organization of these experiences, and evaluative measures to "determine whether these purposes are being attained" in accordance with a behavioral interpretation of the nature of man and education.

Programmed Curriculum and the Behavioral Engineer

The type of curriculum valued by Social Efficiency educators can be called "programmed curriculum." Many types of programmed curricula exist, from individualized computer instruction to programmed courses taught to large groups of students; from mechanical teaching machines that offer students few learning choices to individually prescribed instruction where student interests, abilities, learning styles, and learning rates are accommodated; from environment simulators in which teachers are unnecessary to curriculum packages where the teacher is the center of attention; from programmed textbooks to multimedia courses. Description of one delivery system, the assumptions underlying it, and the procedures used in creating it will illustrate what is meant by programmed curriculum and the scientific technique.

Type to Learn is an individualized instruction curriculum designed to teach students to type using a computer (Sunburst Technology, 2001). The program begins with a movie that tells students about a time travel mission they are going on, introduces them to keyboarding ergonomics, and shows them the keyboard and how to place their hands on it. Students then begin the "mission," which includes 30 lessons, each including review of any previously learned keyboarding skills, demonstration of new keyboarding skills, practice using the new skills, assessments, and a reward in the form of a game when students pass the final assessment for the lesson. An early lesson teaches how to type using the *f, j,* and space bar keys. The lesson begins with the computer speaking to the student and demonstrating how to type *f, j,* and space using an animated image of a keyboard and three-dimensional hands. Immediately after the demonstration, students practice typing *f, j,* and space, with one keyboard stroke being introduced at a time. For example, students might have to type the following sequence of strokes: *fff jjj ffjj fjfj.* If a student makes a mistake, he or she is not allowed to continue until the mistake is corrected. If a mistake is made or the student does not respond in a certain amount of time, the computer first prompts the student with a visual and auditory cue; if this fails to stimulate the appropriate response, it demonstrates how to complete the task with an animated visual of the 3D hands typing the

appropriate response. The computer constantly assesses students' accuracy and speed and presents this information to them as well as saves this information in a teacher management program. When students finish practicing typing the *f, j,* and space, they are given a test. If they pass the test—with sufficient typing accuracy and speed—they are given a reward in the form of a chance to play a game in which they practice the typing skills they have learned thus far. There are several types of games. Key Figures is a keyboarding speed–and accuracy–building exercise in which students meet 50 historical people. To play Dictation, students type exactly what they hear historical people say. Windshield Typers is designed to improve left- and right-hand coordination as students clear the sands of time from their windshield.

Type to Learn carefully sequences the skills students learn as they move from typing individual letters to typing pairs of letters, short words, longer words, sentences, and longer passages, including capital letters and punctuation marks. Students cannot progress to the next lesson until they have satisfactorily completed all previous lessons. As they work through the curriculum, their performance is saved in a teacher management program that records such things as typing accuracy, typing speed, and keys students have difficulty with. Teachers can thus review each student's records and individually adjust passing scores for tests, the amount of practice required, vocabulary levels, and so on.

Type to Learn was designed to provide students with the keyboarding skills they will need as adults to perform well in jobs that require the use of a computer—which are most jobs these days. A secondary benefit of the program is that it builds keyboarding skills that enable students to efficiently complete school and college assignments. The skills students acquire are carefully sequenced from less difficult to more difficult, until performance competency is achieved. The learning experiences students encounter directly simulate activities they will encounter as keyboarders—that is, they learn to type by typing on a computer keyboard. During the program, students are active learners who develop their skills by shaping their behavior in accordance with the requirements of Type to Learn. Students' progress is constantly assessed as they learn. During the program, the teacher is a manager of student progress who adjusts such things in the computer program as vocabulary levels.

Programmed Curriculum

Type to Learn is a programmed curriculum that consists of a carefully sequenced set of learning experiences, each representing a behavior to be learned. Each learning experience consists of one keystroke to be typed and the corresponding correct response. The learning experiences that make up the program are designed and sequenced in such a way as to gradually lead the learner from incompetence to competence.

The method of "behavioral engineering" used to design Type to Learn contains both a conceptual component that explains how programmed curriculum teaches and a methodological component that specifies how it should be created. Underlying both is the curriculum developer's conception of himself as a "behavioral engineer."

Understanding how programmed curriculum teaches requires an understanding of the Social Efficiency view of the nature of teaching and learning. The behavioral engineer views teaching as a process of shaping learners' behavior through the use of rewards or reinforcements. Learners' behavior is to be shaped in such a way that the occurrence of a specific stimulus automatically results in the emission of a desired response. The stimulus that Type to Learn produces for learners is the auditory and visual presentation of a letter, word, sentence, or (eventually) passage. The desired response is typing the corresponding keystroke or keystrokes to replicate the stimulus. Learners are provided several reinforcements and rewards for correct responses: presentation of the next stimulus; a window that constantly updates one's typing speed and accuracy; and, after each lesson's final test, a fun (skill-building) game. The behavior of learners is shaped both by arranging the rewards of learning in such a way that they reinforce the connection between the desired response and the specific stimulus upon which it is contingent, and by not letting a learner proceed to more advanced learning experiences until the desired response to a specific stimulus is automatically emitted.

Underlying this view of teaching and learning are several assumptions.

First, Social Efficiency educators assume that learning consists of a change in behavior, the new behavior being the emitting of a response to a stimulus that would not otherwise have taken place. Something is learned from Type to Learn when a learner responds to a stimulus—correctly typing the keystroke presented by the computer—in a way that he or she would not have prior to exposure to the curriculum.

Second, Social Efficiency educators assume that learning takes place only as a result of learners' practice of the behavior they are to learn, for it is what one does that one learns. The assumption is that people learn by constructing in their brains the connections that allow them to automatically respond appropriately to stimuli. In Type to Learn, learners practice the behavior they are to learn and in so doing learn, because they are required to respond to a stimulus by actually emitting the desired behavior so many times that the stimulus response connections they construct in their minds become automatic. Learning, in fact, takes place in three stages: a cognitive stage, an associative stage, and an automatic stage (Lauber, Robinson, Kim, & Davis, 2001). During the cognitive stage, Type to Learn presents a demonstration of the skill to be learned—an animated movie of hands typing the required keystrokes in response to a verbal and visual stimulus (the letters or other material to be typed) as well as a verbal description of how to type those keystrokes. During this stage, learners store in memory an image of the skill that is to be performed and try to execute the skill by talking or reasoning themselves through it. In the associative stage, learners gradually eliminate errors in performance. Here, connections between stimulus and response are strengthened by practice in such a way that reason can guide but does not need to be used in performance of a particular skill (in other words, understanding combined with the reason that leads to action is gradually transformed into procedural knowledge that leads to automatic performance of the required skill). During the automatic stage, skills learned in the associative stage become increasingly automatic as learners continue to practice typing keystrokes in response to the presentation of text in visual and verbal formats. At this stage, the need to use verbal knowledge, memory, and

reason to perform a skill disappear as the connections between stimulus and response become automatic and occur with such ease that verbal mediation disappears. Learning results as learners construct the mental connections that allow them to automatically perform a keystroke in response to a verbal or visual stimulus.

Third, it is assumed that learning consists of acquiring specific responses to particular stimuli rather than general responses to vague stimuli. For example, in Type to Learn, it is assumed that one does not learn to type in general, but that one learns how to replicate specific letters seen or heard with specific corresponding keystrokes. Type to Learn presents one stimulus to learners at a time, to which there is only one specific and clearly defined response.

Fourth, it is assumed that learners acquire complex behaviors gradually by slowly building up ever more complex repertoires of behavior out of simpler ones. Programmed curricula move learners in finely graded steps through many unitary learning experiences, each of which develops a single behavior in such a way that successive, more complex behaviors build on the simpler behaviors preceding them. For example, Type to Learn first teaches individual keystrokes, then combinations of keystrokes, then words, and eventually teaches the learner to duplicate longer textual and verbalized passages. In addition, a programmed curriculum guarantees that learners will actually gradually build ever more complex repertoires of behavior, because it evaluates learners' responses to each learning experience and does not allow them to advance to subsequent levels of complexity until they have demonstrated that they have mastered the preceding material.

Fifth, it is assumed that all aspects of learning can be dealt with by using this view of teaching and learning. Complex behaviors, such as learning how to fly an airplane, simply require the development of complex teaching machines, such as the computerized flight simulators developed by the U.S. Air Force. Learning intellectual skills can also be taught. For instance, mathematical problem solving simply requires that learners be provided with (a) advanced organizers and problem solving demonstrations so that they can, with the aid of memory and reason, respond to stimuli and replicate the demonstrations when presented with new problems, and then (b) much practice internalizing the desired problem solving skills in such a way that they become automatic responses to certain types of mathematical problems.

Behavioral Engineering

Social Efficiency educators construct programmed curricula through the use of "behavioral engineering" (Holland, 1960, p. 275). Behavioral engineers engage in five basic tasks, which parallel Tyler's questions, while developing curriculum.

Their first task is to obtain educational purposes for their curricula. These are behaviorally phrased and specify the terminal performances learners are to acquire. Educational purposes are obtained from clients for whom programs are designed—behavioral engineers do not invent them themselves. Possible clients include society, scholarly organizations, parents, teachers, publishers, and businesses. Type to Learn was designed for an educational publisher who had determined that businesses, industry, and schools wanted workers and students to have keyboarding skills.

The second task behavioral engineers undertake is careful analysis of their program's educational purpose to find a sequence of specific behavioral objectives, each of which represents one stimulus-response contingency that a learner must acquire in order to gradually move from incompetence to competence. Different forms of this analysis are referred to as task analysis, activity analysis, and the construction of a learning hierarchy. Construction of a learning hierarchy

> requires that the behaviors that lead to terminal behaviors [be] carefully analyzed and sequenced in a hierarchical order such that each behavior builds on the objective immediately below it in the sequence and is prerequisite to those that follow it. (Holland, 1960, p. 275)

Robert Gagne (1970) describes the construction of a learning hierarchy this way:

> Analysis of a topic begins with the statement of the terminal objective—the performance or performances one expects the student to be able to exhibit after the learning of that topic has been completed. Once this objective has been satisfactorily defined, one can proceed to identify a subordinate set of subtopics, each an individual learning act, that must be considered prerequisites for the learning. Each of these subtopics in turn may be subjected to the same process of analysis, until one has arrived at performances that the students are known to possess, at which point the analysis stops. Each subordinate objective, then, is derived by systematically applying to the next higher objective the question, "What must the student already know how to do, in order to learn this performance?" The description of what the student must know—in other words, the prerequisite capabilities he must have—identifies the subordinate objectives. (p. 329)*

This is not a simple endeavor, for creation of a program of any length requires defining and sequencing many specific behavioral objectives. Underlying each of the 30 units in Type to Learn are several subordinate objectives, such as "When presented with the letter *j* in written form, the learner will press the *j* key on a computer keyboard with the first finger of the right hand."

The third task behavioral engineers undertake is creation of the learning experiences that the learner will encounter while moving through the curriculum. Learning experiences consist of activities in which students engage that contain stimuli associated with the responses students are to learn. Each learning experience must be created to correspond to one of the clearly specified subordinate behavioral objectives previously defined as a result of task analysis. Larger learning experiences may consist of several smaller learning experiences. Each of the 30 units in Type to Learn presents students with several learning experiences, including demonstrations, practice of newly learned skills, practice of previously learned skills, and games.

The fourth task is to organize the learning experiences that the learner will encounter. This involves creating a linear sequence of experiences that parallels the sequence of specific subordinate behavior objectives derived as a result of task analysis.

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In Type to Learn, part of the sequence of each unit involves the repeated format of experiences that provide opportunities to review previously learned skills, demonstrate new skills to be learned, practice new skills, assess new skills, and practice new and old skills in the form of games. In the end,

> the actual instructional content of a program consists of a sequence of learning tasks or activities . . . through which a student can proceed with little outside help, and provides a series of small increments in learning that enables the student to proceed from a condition of lack of command of the terminal behavior to that of command of it. (Lindvall & Bolvin, 1967, p. 231)

The fifth task behavioral engineers undertake is designing evaluative measures to accompany each learning experience. Evaluative measures are developed to assess whether or not learners acquire the desired behavior from each learning experience. They serve the following functions:

- They provide "rather immediate feedback to the student concerning the adequacy of his performance on each frame or element of the program" (Lindvall & Bolvin, 1967, p. 231) under the assumption that "learning is enhanced if students receive rather immediate feedback concerning the correctness of their efforts in attempting to approximate a desired behavior" (p. 249).
- They determine whether learners will be allowed to proceed to successive program experiences or whether they must do additional work before proceeding. They do so by assessing whether or not learners have acquired the desired behavior from each learning experience—that is, made the correct response to the program's stimulus.
- They provide a continual "monitoring function, both for the learner and the teacher" (Lindvall & Bolvin, 1967, p. 231) that can keep them both "rather continuously informed regarding [the learner's] goals and his performance" (p. 249).
- They provide the behavioral engineer with information about the effectiveness of a program in obtaining its educational purposes. Such information can be used as a basis for revising either the learning experiences or their sequence (formative evaluation) or for proving that the curriculum accomplishes its purposes (summative evaluation).

In summary, those who design programmed curriculum view themselves as behavioral engineers who use scientific techniques to design a series of experiences that shape the behaviors of learners to satisfy the needs of a client.

The Analogy

In an analogy comparing curriculum development to the industrial manufacture of steel rails, Franklin Bobbitt laid bare the essentials of the Social Efficiency ideology. The school is compared to a factory. The child is the raw material. The adult is the finished product. The teacher is an operative, or factory worker. The curriculum is whatever processing the raw material (the child) needs to change him into the finished product (the desired adult). The curriculum developer is a member of the research department who investigates what the consumer market (society) wants in terms of a

finished product and finds the most efficient way of producing that finished product (Bobbitt, 1913).

Objectives and Standards

Curriculum workers, thus, have two tasks: they must determine what the consumer market wants in terms of a finished product, and they must determine the most efficient way of producing that product. Bobbitt (1913) describes these tasks in his first two principles of curriculum making:

> Principle I. Definite qualitative and quantitative standards must be determined for the product [the desired adult].
>
> Principle II. Where the material [man] that is acted upon by the labor processes [teacher] passes through a number of progressive stages on its way from the raw material [child] to the ultimate product [adult], definite qualitative and quantitative standards must be determined for the product at each of these stages. (p. 11)

The first principle refers to the creation of a curriculum's terminal objectives, or what Tyler calls "educational purposes." They designate the ends of the curriculum and the standards that indicate when the ends have been satisfactorily met. Social Efficiency educators between about 1910 and 1940—including Franklin Bobbitt—focused their efforts on fulfilling Principle I.

The second principle refers to the creation of progressive objectives, which consist of the series of specific behavioral objectives that collectively specify the step-by-step changes in learners that transform them from incompetence to competence and the standards that indicate when each progressive objective is accomplished. Social Efficiency educators between about 1950 and 1975 focused their efforts on Principle II. Robert Gagne is an example of such an educator.

Both of these principles refer to determining "definite qualitative and quantitative standards" that specify whether learners are meeting the requirements of objectives as they traverse the curriculum. From 1980 until now, some politicians and administrators promoting the Social Efficiency ideology have focused their efforts on establishing curriculum standards and performance-based accountability methods that hold learners, teachers, and schools accountable for meeting the requirements of such standards. The establishment of educational standards has been promoted by pressuring states to develop curriculum standards. Performance-based accountability methods have been promoted through political means and involve the use of management, accounting, and budgetary techniques to shape the behavior of educators. These are illustrated by the No Child Left Behind Act, the Teaching Commission report (2004), and the Race to the Top Program (U.S. Department of Education, 2009). Social Efficiency educators have emphasized the importance of terminal objectives, progressive objectives, educational standards, and accountability for almost a hundred years. However, differential emphasis has been placed on them at different times.

Social Orientation and Terminal Objectives

In Bobbitt's analogy, society is the source from which terminal objectives are determined. Since society does not realize the importance of specifically stating terminal objectives, it becomes educators' job to discover them. Educators, acting as agents of society, must determine the needs of society and the products that fulfill those needs. Just as a steel mill is no more than a contractor to do a job for railroads in making rails, so too are educators and schools no more than contractors to do a job for society in making suitable adults. Bobbitt (1913) puts it this way:

> It is well to note also, for our purposes, that the standard qualifications of the product are not determined by the steel plant itself. The qualitative and quantitative specifications are determined by those that order the product, in this case, the railroads. The steel mills are but agents of the railroad. . . . Now the relation of the school system to the various departments of the world's activity is exactly the same as the relation of the steel plant to the transportation industry. . . . It is the need of the world of affairs that determines the standard specification for the educational product. A school system can no more find standards of performance within itself than a steel plant can find the proper height or weight per yard for steel rails from the activities within the plant. . . . The standards must of necessity be determined . . . by those that use the product, not by those who produce it. . . . Standards are to be found in the world of affairs, not in the schools. (pp. 12, 33–35)

Progressive Objectives

This is not the case for progressive objectives. Although society specifies the desired product of the schools, it is educators who determine the most efficient way of producing it:

> The progressive standards required by the second principle must be psychologically and experimentally determined by expert educational workers within the school system itself. This is a special professional problem requiring scientific investigation of a highly technical sort. It is a field of work in which the untrained layman can have no opinion and in which he has no right to interfere. Society is to say what shall be accomplished in the ultimate education of each class of individuals. Only the specialist can determine how it is to be done. (Bobbitt, 1913, p. 37)

Education

Within the Social Efficiency ideology, the production of an educated person through schooling is viewed in much the same way as the production of steel rails:

> Education is a shaping process as much as the manufacture of steel rails; the personality is to be shaped and fashioned into desirable forms. It is a shaping of more delicate matters, more immaterial things, certainly; yet a shaping process none the less. It is also an enormously more complex process because of the great multitude of aspects of the personality to be shaped if the whole as finished is to stand in full and right proportions. (Bobbitt, 1913, p. 12)

Scientific Instrumentalism

The central myth of the Social Efficiency ideology is "scientific instrumentalism" (Patty, 1938, pp. 6–7). This myth asserts that (a) curriculum should be developed in a "scientific" manner similar to the way industry produces its products and (b) curriculum development should be an "instrument" in fulfilling needs unassociated with its own vested interests in a manner similar to the way industry fulfills needs unassociated with its own interests.

The method is called "scientific" because educators attempt to use scientific procedures, placing their faith in what they conceive to be scientific method and technology. The method is called "instrumentalistic" because educators using it conceive of themselves as instruments and of their method as an instrument useful in fulfilling an end that is disjoint from themselves and their method.

Social Orientation

Society

The Social Efficiency ideology views education as a social process that perpetuates existing social functions. Bobbitt (1924a) infers this when he writes,

> We are accustomed to say that education is a social process. It is the process of recivilizing, or civilizing anew, each new generation.
>
> Each individual, we are told, is born on the cultural level of one hundred thousand years ago. He is but a bundle of potentialities. He brings with him no portion of our accumulated human culture. Literally, he is born a savage. Education is the process of so conditioning his activities and experiences that, as he grows up, he is shaped into the normally civilized man.
>
> What is true of the individual is true of the whole new generation. . . . Society has the responsibility of so conditioning the growth of this new generation that it takes over and exhibits in its conduct the high and complex culture activities which man has been slowly inventing, accumulating, and habituating himself to during the long period of human history. Society's performance of this recivilizing function we call education. (p. 453)

Two Social Efficiency assumptions alluded to here are critical. First, society is viewed as consisting of a "system of activities" (Bobbitt, 1926, p. 1). Second, the essence of society is viewed as located in the activities its adult members engage in. Society is defined in terms of the "affairs of the mature world" and not in terms of the affairs of youth (Bobbitt, 1918, p. 207).

People in Society

People are first members of society and second individuals. As members of society, people have two characteristics.

First, people are conceived of as actors within society. Their essence is determined by the behaviors they can successfully perform. Bobbitt (1924c) elaborates on this from the context of what Social Efficiency educators are reacting against:

> A recently published book begins with the sentence "Education is the process of filling the mind with knowledge." In that single sentence we have the central conception of the old education. According to this conception, a human being, as he begins life, is mainly but an empty knowledge reservoir. The business of education is to fill this reservoir with the prepared facts of history, geography, grammar, science, and the rest. . . . Man is not a mere intellectual reservoir to be filled with knowledge. He is an infinitely complex creature of endlessly diversified action. His most salient characteristic is not his memory reservoir, whether filled or unfilled, but action, conduct, behavior. Action is the thing of which his life is made. In his activity he lives and realizes the ends of his existence[;] . . . his behavior is his life. Primarily, he is not a knower, but a doer. . . . Since he is primarily a doer, to educate him is to prepare him to perform those activities which make up his life. The method of the new education is not subject storage but action, activity, conduct, behavior. (pp. 45–47)

Second, people's essence is viewed as embodied in their mature adult behavior. As such, childhood is viewed as a stage of preparation for adulthood. Childhood is not important in and of itself. It is important because it provides a time to prepare for adulthood. Thus, education of the 6-year-old is to prepare for that of the 7-year-old, the education of the 7-year-old for that of the 8-year-old, and so on until maturity is reached. As Bobbitt (1924b) says, "it is helpful to begin with the simple assumption, to be accepted literally, that education is to prepare men and women for the activities of every kind which make up, or which ought to make up, well-rounded adult life" (p. 7).

> Modern education . . . has discovered the child, but it does not see him merely as a child. . . . It sees the man within the child as clearly as it sees the child. It sees its task as one of bringing into full and complete being this man within the child. (Bobbitt, 1924c, p. 48)

The educator always keeps in mind "the man within the child," viewing the education of the child as preparation for his or her adulthood within society, for as Bobbitt (1924b) insists, "education is primarily for adult life, not for child life. Its fundamental responsibility is to prepare for the fifty years of adulthood, not for the twenty years of childhood and youth" (p. 8).

Educating People to Live in Society

The aim of education is twofold: first, to perpetuate the functioning of society, and second, to prepare the individual to lead a meaningful adult life in society. An individual achieves an education by learning to perform the functions one must perform to be socially functional. In addition, the educated person is one who acts appropriately in society. Each of these statements needs clarification.

The necessity for perpetuating society is accepted unquestionably. The means of perpetuating society is preparation of the individuals who will constitute it to fulfill the social roles needed to sustain its functioning. This is the job of the school: "Society possesses the right to require that the school shall educate its offspring so that they will be prepared to carry on the work of society with efficiency" (Bobbitt, 1924b, p. 13).

Society is made up of people. And people take on their meaning, as well as their fulfillment and pleasure, by participating in society. The way to prepare individuals to

lead meaningful adult lives in society is to provide them with the skills that will allow them to be constructive, active members of society. This is also the job of the school:

> It is this social organization that must transform the highly dependent young child into the adult who, in his own individual manner, lives a life that is satisfying to himself largely because it contributes to the goals of his society. (Gagne, 1965b, p. 237)

(Thus, children learn to type because keyboarding is a skill adults need to efficiently contribute to the goals of society and to their success as members of society.)

People are taught to perpetuate the functioning of society and to constructively function in society through "functional education," a term that applies both to teaching students to *function in the future activities* in which they will be engaged once they become mature members of society, and to teaching students to act in the desired way by having them *function in the desired way.* (Thus, children learn to type by typing with the correct fingering.) Functional education thus derives the means by which education is to take place directly from the ends of education: "One learns to act in desired ways by acting in those ways" (Bobbitt, 1924d, pp. 292–293). Bobbitt (1924c) elaborates:

> One learns to act by acting. One learns to live by living. Behavior is not only the end of life but also the process of life and equally the end and process of education. . . . Education is preparation for life, and life is a series of activities. Education, therefore, is preparation for the performance of those activities. Let us discover what the activities are which make up man's life and we have the objectives of education. . . . In discovering the objectives in terms of activities, however, one is also discovering the fundamental processes involved in achieving these same objectives, since, obviously, the way to learn to perform an activity is to perform it. (pp. 47, 49)

Finally, the educated person is one who functions appropriately and effectively in society. The ability to act correctly, rather than the knowledge of what the correct action should be, is what is important to learn. As Bobbitt (1926) puts it, "the business of education today is to teach to the growing individuals, so far as their original natures will permit, to perform efficiently those activities which constitute the latest and highest level of civilization" (pp. 1–2). Education

> has the function of training every citizen, man or woman, not for knowledge about citizenship, but for proficiency in citizenship. . . . We have been developing knowledge, not function; the power to reproduce facts, rather than the powers to think and feel and will and act in vital relation to the world's life. (Bobbitt, 1918, p. iv)

Education for a Better Society

Social Efficiency educators view themselves as instruments furthering the development of a future society superior to the existent one and not as proponents of the status quo. Although they see the school as the guardian of the system of values and institutions that the society has already evolved, their aims of education for both the child and the society are phrased in the future tense:

> Education under the circumstances has, therefore, a double task to perform: (1) to act as a primary agency of social progress, lifting the world to a higher and more desirable level; (2) to do this by educating the rising generation so that they will perform their . . . functions in a manner greatly superior to that of their fathers. The task is to develop in the rising generation, not merely the degree of proficiency found in the world about them, but to carry them much beyond; to look, not merely to the actual practices, but rather to those that ought to be. It is so to train them that the . . . mistakes, weaknesses, imperfections, maladjustments, etc., that now appear so numerously in the . . . situations of their fathers shall be as fully as practicable eliminated in that more harmonious and more efficient . . . regime that they are to establish and maintain. (Bobbitt, 1918, p. 64)

The preparation of society for the future is based on precedents within current society. The strategy for change is not to look for new behaviors more appropriate than existing ones, but to reinforce strengths and desirable traits within current society while eliminating its weaknesses and deficiencies. The assumption is that cultural evolution takes place by training youth to do that which is done most efficiently and effectively in the culture and to avoid that which is done inefficiently and ineffectively. By this differential reinforcement-elimination it is believed that the betterment and evolution of society will be achieved.

Objectives

Several consequences of how Social Efficiency educators deal with terminal and progressive objectives require discussion. This requires that the form of objectives and the methods of deriving them be examined further.

Terminal objectives are the educational purposes of curriculum, the ends toward which educators directs their efforts in their attempts to perpetuate society by providing people with the skills needed to productively function within society. Their discovery and clear specification is the first task educators undertake.

Franklin Bobbitt defines progressive objectives when he states that "the material [man] that is acted upon by the labor processes [teacher] passes through a number of progressive stages on its way from the raw material [child] to the ultimate product [adult]." Progressive objectives are the specific behavioral objectives that designate the particular tasks ("progressive stages") the student must sequentially master ("pass through") in order to achieve competency in the activity inherent in the terminal objective (become "the ultimate product"). Deriving and sequencing progressive objectives is the second task of educators.

The Form of Objectives

The technology of scientific instrumentalism in combination with the behavioral conception of the nature of man requires that curriculum objectives be stated as behavioral objectives. There are several characteristics of behavioral objectives.

First, they must be stated in behavioral terms that specify observable behaviors, action capabilities, actions, skills, or cognitive processes. This excludes many things:

> To "know," to "understand," to "appreciate," to "gain insight into," and so on, are excellent words to convey general purposes, but they are not useful as descriptions of reliably observable behavior; nor are their intended meanings easily agreed upon by a number of individuals. (American Association for the Advancement of Science [AAAS], Commission on Science Education, 1968)

Second, to be useful, objectives must be self-contained, unitary in effect, "definite and particularized." Social Efficiency educators consider it impractical to attempt to accomplish vague and general objectives, such as teaching citizenship. As Bobbitt (1918) phrases it,

> education cannot take the first step in training for citizenship until it has particularized the characteristics of the good citizen. The training task is to develop those characteristics. It is not enough to aim at "good citizenship" in a vague general way. . . . The citizen has functions to perform. We are to develop ability to perform those functions. But first we must know with particularity what they are. (p. 117)

Third, Social Efficiency educators endeavor to state objectives in a standardized form. From Gagne's (1970) perspective,

> an objective . . . is a verbal statement . . . having the following components: 1. A verb denoting observable action (draw, identify, recognize, compute, and many other words qualify; know, grasp, see, and others do not). 2. A description of the class of stimuli being responded to (for example, "Given the printed statement ab + ac = a(b + c)"). 3. A word or phrase denoting the object used for action by the performer, unless, this is implied by the verb (for example, if the verb is "draw," this phrase might be "with a ruling pen"; if it is "state," the word might simply be "orally"). 4. A description of the class of correct responses (for example, "a right triangle," or "the sum," or "the name of the rule"). (pp. 326–327)

According to those who rewrote Bloom's *Taxonomy of Educational Objectives* in 2001, "educational objectives indicate that the student should be able to do something (verb) to or with something (noun)—a verb-noun relationship" (Anderson et al., 2001, p. 265). For the cognitive domain, this involves using one of the following verbs (or one of their many subtypes): remember, understand, apply, analyze, evaluate, create. Each specifies a "cognitive process," action, or behavior. Stating educational objectives this way also involves using one of the noun phrases of factual knowledge, conceptual knowledge, procedural knowledge, or metacognitive knowledge (or one of their subtypes) to specify a type of knowledge students are expected to acquire or construct.

Fourth, terminal and progressive objectives can take on meaning associated with many types of human activity, including cognitive, affective, and psychomotor activity. In addition, terminal and progressive objectives are discoverable or derivable. As Bobbitt (1918) says,

> they can be discovered. This requires only that one go out into the world of affairs and discover the particulars of which these affairs consist. These will show the abilities,

> attitudes, habits, appreciations, and forms of knowledge that men need. They will be the objectives of the curriculum. They will be numerous, definite, and particularized. (p. 42)

Social Efficiency curricula are, however, far more often designed to teach physical and cognitive skills than affective skills.

Fifth, the form of curriculum objectives is often of greater concern to Social Efficiency educators than their content. Educators view themselves as agents of clients, whose vested interests are in the content of the objectives. Social Efficiency educators' vested interests are in designing curricula that satisfy their clients. Educators focus their endeavors on clearly specifying the clients' desires, efficiently deriving objectives, and accurately assessing behavior. As Mager (1962) comments in *Preparing Instructional Objectives,* "this book is not concerned with which objectives are desirable or good. It concerns itself with the form of a usefully stated objective" (p. 1).

Gathering Terminal Objectives

Essential to determination of terminal objectives is for educators to "go out into the field, actually study the men and women as individuals, and generalize on the basis of a numerical count of cases" (Peters, 1930b, p. 433). "Going out into the field" and "numerical count of cases" are critical because society has not delivered to schools a complete and definitive list of terminal objectives (except during the standards movement at the end of the 20th and beginning of the 21st centuries, when Social Efficiency adherents pressured states to adopt, adapt, or create content standards). As a result, educators must act as agents of society in discovering terminal objectives. Different approaches can be taken. Early in the 20th century, Bobbitt attempted to poll the whole of American society as a first step to discovering both what its needs were and how it felt such needs could be satisfied. During the middle of the 20th century, Gagne interviewed many scientists as he worked on *Science: A Process Approach* (AAAS, 1968). In so doing, he made heavy use of personal interviews as a means of collecting data. In both cases, it was necessary to "go out into the field . . . and generalize on the basis of a numerical count of cases."

In compiling terminal objectives, educators first determine "what are the major divisions or fields of human action?" and then "in each major field—whether six, ten, twenty, or fifty—what are the specific adult activities of the good type?" (Bobbitt, 1918, p. 5). This involves first specifying the major fields of human action and then partitioning each field into a set of specific behaviors, such that each specific behavior can be represented as a terminal objective to be aimed at. As Gagne (1970) says of terminal objectives, it is "necessary to *break them down into smaller units* representing fairly specific intellectual skills" (p. 245). As Bobbitt (1924b) states, these objectives will be "minute" and "numerous" (pp. 8–10). This has been the procedure used by many states and professional organizations in developing curriculum content standards since the end of the 20th century.

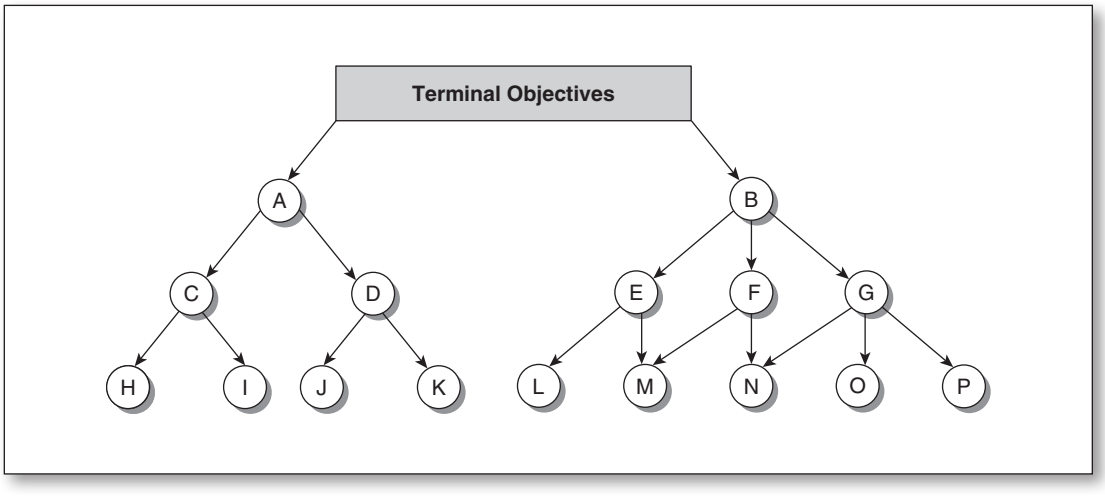
Acquiring Progressive Objectives

The process of formulating the "progressive stages" which the student must pass through in moving from incompetence ("raw material") to competence ("finished product") is called activity analysis. Activity analysis exists in a wide variety of forms. Two of them—Bobbitt's and Gagne's—will be briefly discussed.

Franklin Bobbitt's early form of activity analysis is based on an assembly line model of education. It includes three basic stages. First, the overall job to be completed—the performance necessary to achieve the terminal objective—is broken down into a finite set of tasks that need to be completed, the sum of which result in the completed job. Second, each task is analyzed to find the most efficient way of performing it. (Bobbitt used elapsed time as the criterion of efficiency.) Third, a flow chart is created which specifies the manner in which each task is to be performed, the time allowed to complete each task, the standards that each task must meet, and the sequence in which the tasks are to be completed.

Robert Gagne's form of activity analysis begins with the analysis of a terminal objective. Gagne (1963) begins by asking the question, "What must the learner already know how to do in order to achieve this performance, assuming that he is to be given only instructions?" (p. 622). Let us say that the learner could not perform the task specified by the terminal objective unless he could first perform prerequisite tasks A and B. A pyramid begins, as illustrated in Figure 3.1.

Figure 3.1 Pyramid of prerequisite objectives.



Tasks A and B are now the new objectives to be accomplished, which Gagne calls "prerequisite objectives." Gagne now asks his question again, this time regarding prerequisite objectives A and B: "What must the learner already know how to do in order to achieve this performance, assuming that he is to be given only instructions?" Let us say that the learner must be able to perform tasks C and D in order to perform task A, and that he or she must be able to perform tasks E, F, and G in order to perform task B. The learning pyramid grows, as illustrated in Figure 3.1. The process is then repeated with C, D, E, F, and G as the prerequisite objectives. The result of this next stage of analysis might produce the more complete learning pyramid illustrated in Figure 3.1.

In this manner, educators build a pyramid of prerequisites to the terminal objective. The process ends when the subordinate performances possessed by every learner for whom the learning program is intended are arrived at. This pyramid of prerequisite objectives capped by a terminal objective is called a learning hierarchy. Once the initial learning hierarchy is deductively derived, it is empirically tested to see if it is "psychologically" complete and accurately ordered. Then the two-dimensional hierarchy is broken down into a one-dimensional learning sequence that preserves the hierarchical prerequisite nature of the learning hierarchy. In running the curriculum, the student proceeds through this learning sequence to attain the performance abilities inherent in the terminal objective.

Atomism

To put objectives in a behavioral form that is self-contained, unitary in effect, and "definite and particularized," the aims of an educator's client must be broken down into unitary and self-contained entities. This breaking down of a general objective or partitioning of a complex behavior into its smallest unitary actions is called atomism. In creating terminal objectives, educators must atomize the field of action they are preparing individuals to function within. They must break up the field of action into sufficiently small units such that each is of the smallest convenient size. They must treat the behaviors they are formulating into terminal objectives as a set of independent actions, the sum of which make up the complete behavior. This means that one must conceive of human life and human activity as capable of being "broken up into a very large number of specialized activities, for the most part distinctly marked off from each other" (Peters, 1930b, p. 84).

Constructing progressive objectives through activity analysis also involves atomism. The process of transforming the raw material into the finished product involves breaking the desired activity up into a finite sequence of unitary subactivities, each of which is analyzed and treated as an individual atomistic process within the larger activity.

Underlying the Social Efficiency approach to curriculum is, thus, the belief that human life and human activity can be divided into a large number of self-contained, specialized activities, each distinct from the others. In addition, Social Efficiency educators treat the atomistic activities they construct as though they can be directly assembled into larger activities through a simple additive process. That is, the sum of the independent unitary subactions comprising progressive objectives is assumed to equal the complete terminal behavior.

Objective Reality

The necessity of collecting terminal objectives by "going out into the field, actually studying men and women as individuals, and generalizing on the basis of a numerical count of cases" raises questions about the types of reality Social Efficiency educators are concerned about. The distinction has long been made between the "subjective reality within man's mind" and the "objective reality in the world outside of man." Social

Efficiency educators accept this dichotomy and concern themselves primarily with objective reality.

Terminal objectives refer to observable and measurable actions of people. They are to be found in objective reality and not subjective reality. When collecting terminal objectives, educators must "go out into the field" and actually study the actions performed by people, for terminal objectives are drawn from the actions people perform and the behavior repertoires mankind needs to successfully maintain the functioning of society. For these educators, the starting point is always the activities of mankind as manifested in objective behavior, rather than the needs of mankind as assumed to exist within the subjective mind.

The necessity of determining terminal objectives by "generalizing on the basis of a numerical count of cases" is also central to the Social Efficiency ideology. This is because the reality conceived to be of most worth is defined in a normative manner and not in an idiosyncratic manner. Social Efficiency educators' concern is what the majority of the members of society (or their client group) conceive to be "real" or "true" or "necessary." They care about social norms rather than individual uniqueness. Thus, there is an emphasis on statistical analysis during curriculum work. This results in an emphasis on concern for the individual with respect to achieving normative ends rather than on concern for the person with respect to achieving idiosyncratic ends. Social Efficiency educators focus on what the needs of the society *are* and not what men *think* they should be (Bobbitt, 1926, p. 20).

Progressive objectives are also determined by focusing on the observable and measurable actions in which a person engages rather than on the inherent nature of the person. Consequently, Social Efficiency educators (a) make a weighted distinction between the individual as a possessor of certain capabilities for action and the individual per se, (b) partition individuals' actions apart from the individuals themselves, and (c) deal with individuals' action capabilities as entities separate from the individuals themselves. As a result, only those aspects of people that can be atomistically observed and measured—the objective aspects—are considered; the subjective aspects of people, which are not readily observable, measurable, or atomistic, fade into the background.

Causality

Underlying the process of designing progressive objectives through the use of activity analysis are assumptions about causation, that is, how the raw material is transformed into the finished product. The basic assumption is derived from Newtonian mechanics; causation is conceived of within a context in which cause and effect, action and reaction, or stimulus and response are linked together in a deterministic pattern reducible by analysis to single and simple atomic transferences of energy. Three aspects of this assumption need elaboration.

First, planning for change in the human organism is thought of within a cause-effect, action-reaction, or stimulus-response context. This conception of human change requires that Social Efficiency educators use two types of planning while creating curricula: (1) they must predetermine the relationship between cause and effect,

action and reaction, or stimulus and response, and (2) they must plan the causes, actions, or stimuli that in a direct and predictable manner will lead to the desirable effect, reaction, or response. As a result, the changes that are planned for during curriculum creation are only those which fit into a stimulus-response pattern and which can be observed to be directly behaviorally linked.

Second, this interpretation of causality is deterministic. Educators believe they can predetermine the changes that will take place in people's behavior as a result of their encounters with specified stimuli within the curriculum. That is, they assume that changed behavior resulting from exposure to the curriculum can be known in its entirety before the change takes place. Free will plays little part within this system—events are entirely determined by previous causes. Bobbitt (1920) expressed the spirit underlying the Social Efficiency posture toward determinism this way:

> In the world of economic production, a major secret of success is predetermination. The management predetermined with great exactness the nature of the products to be turned out. . . . They standardize and thus predetermine the processes to be employed, the quantity and quality of raw material to be used for each type and unit of product, the character and amount of labor to be employed, and the character of the conditions under which the work should be done. . . . The business world is institutionalizing foresight. . . . There is a growing realization within the educational profession that we . . . too, must institutionalize foresight, and, so far as conditions of our work will permit, develop a technique of predetermination of the particularized results to be obtained. (p. 738)

Third, change in human behavior is conceived of as a shaping process. It is "a shaping process as much as the manufacture of steel rails" (Bobbitt, 1913, p. 12). The behavioral engineer aspires to manipulate the human shaping process with the same degree of control the industrial engineer exercises as he molds steel rails into the form he desires them to be. Within this context, the human beings who will undergo the shaping process are treated as though they have about as much to say about what is happening to them during the shaping as the steel has to say about what is happening to it during its shaping. Free will and self-determination do not have a prominent place in the Social Efficiency ideology.

Ends, Means, and Instrumental Values

One of the distinctive aspects of curriculum creation within the Social Efficiency ideology is the clear dichotomy that exists between terminal objectives and progressive objectives, between the social orientation and the methodological orientation, between the ends of the curriculum and the means of creating the curriculum. Terminal objectives are associated with the ends of the curriculum: they are discoverable in society. Progressive objectives are associated with the means of creating curriculum: they are derived from the methodology of "scientific instrumentalism." Ends must be clearly specified, and their value lies in their ability to reflect the needs of society. Means must also be clearly specified, and their value lies in their ability to achieve the ends efficiently.

In both cases, the criterion of value is independent of the curriculum. Ends are judged in terms of their ability to reflect the needs of society and not in terms of anything inherent within themselves. Means are judged in terms of their efficiency in meeting the ends and not in terms of anything inherent within either themselves or the ends.

Thus, in both cases, educators ask that the value of their work be defined in terms of a criterion independent of the work itself, and that criterion is essentially one of efficiency. In the case of ends, efficiency is measured in terms of optimal reflection of social needs in the terminal objectives. In the case of means, efficiency is measured in terms of optimal cost (time, money, natural resources, etc.) in achieving the ends. Ends and means are both to be judged as instruments that contribute to the attainment of goals external from themselves, and instrumental values based on the ethically neutral concept of efficiency are to be used as the criteria for judging them. As a result, there is no criterion of value for judging "good" or "bad," "just" or "unjust," or "sane" or "insane" ends for the curriculum. Neither is there a criterion of value for judging "kind" or "unkind," "moral" or "immoral," or "responsible" or "irresponsible" means of creating the curriculum. Bobbitt (1918) points out the pervasiveness of this system of instrumental values when he writes that "any instrument or experience which is effective . . . is the right instrument and right experience; and . . . anything that is not effective is wrong" (p. 283).

Historical Context

The Social Efficiency ideology has its origins in four movements: social reform, utilitarian education, behavioral psychology, and scientific methodology (Callahan, 1962). These movements are still active in promoting the Social Efficiency ideology today.

Social Reform

Muckraking journalism during the first two decades of the 20th century developed a reform-conscious population that put social needs above all else. Bobbitt (1913) expressed the spirit of the times when he exclaimed,

> The ideal of social service is rapidly becoming the corner-stone of faith in every department of human affairs—in none certainly more than in the field of education. In this service, "social efficiency" is becoming the chief watchword and the chief aim. (p. 50)

Muckraking journalism and the accompanying social reform movement influenced the Social Efficiency ideology by inspiring it to make the needs of society its highest priority and to conceive of society as the sanctioning body in which individuals take meaning.

As we enter the 21st century, the successors of earlier muckraking journalists continue to stir public discontent with education (Bracey, 2003). Currently, "there is a distinct rhetoric of blame, shame, and punishment throughout the conversation about quality [education], with the frontline classroom teacher and his or her students bearing

much of the day-to-day brunt of this tactic" (St. Pierre, 2006, p. 241). In 2004, the Teaching Commission asserted that it wanted to "bring a national sense of urgency" (p. 5) to "the sorry state of American Schools." (p. 12). It attempted to do so by pointing out that "academic achievement" in the U.S. is inadequate, as measured both by the National Assessment of Educational Progress and international comparisons ("which show that American teens continue to lag behind high-school students in many other industrialized nations," p. 13). The following statement sums up the tenor of the national discussion on education: "The capacity of America's educational system to create a 21st-century workforce second to none in the world is a national security issue of the first order. As things stand, this country is forfeiting that capacity" (p. 20).

Utilitarian Education

The movement for utilitarian education during the last quarter of the 19th century and the first quarter of the 20th century emphasized the importance of making schools useful and relevant to the life of individuals and the nation. Utilitarian education was an outgrowth of the agricultural education, manual training, industrial education, trade school, and vocational education movements and the increasingly popular business ideology (Kliebard, 2004, chaps. 4–5). This was Bobbitt's (1924c) "functional education," which trained "man for the performance of the functions or activities which constitute his life" (p. 45). It involved providing students with job training skills that would allow them, as adults, to function constructively in an industrial society (as was the intent of Booker T. Washington's Tuskegee Normal Institute, which focused on the manual training of African Americans). The utilitarian education movement also embodied a reaction to academic education in schools, which consisted of generally useless textbook memorizing that prepared people only for life in the university.

The movement for utilitarian education during the beginning of the 21st century is considered by Social Efficiency advocates to be related to the economic health of society—in particular the economic health of business and the U.S. economy: "A quality educational system is an absolute essential to the economic, political, and social welfare of the United States. . . . There is a consensus that students need employable skills for the new economy" (Lessinger & Salowe, 2001, pp. 11–12). Education must do its job in training highly productive workers for business, whose continued health will support a strong U.S. economy. According to the Teaching Commission (2004), the goal, as before, is to help children learn "to become successful, contributing citizens," because "around the world . . . the most vibrant and stable economies draw their strength from a well-educated, highly skilled citizenry"; "in a competitive global economy, all citizens must continually race to obtain new, higher skills" for a "highly skilled citizenry"; and "student achievement . . . is directly related to . . . national economic growth" (pp. 12–14).

Even so, Schultz (2006), in an article in the journal of the Association for Career and Technical Education regarding the reform movement that took place between 1985 and 2005, asks "was it good for you?" His answer, from the perspective of utilitarian education, is that "one would suspect not" (p. 44). During this period, the percentage

of students enrolled in utilitarian courses decreased greatly as students in academic courses increased.

Behavioral Psychology

During the first two thirds of the 20th century, behavioral psychology provided the Social Efficiency ideology with a psychological context in which to frame its endeavors. The deemphasis on the subjective behavior of people, the interpretation of mind as the total behavioral response of people, the emphasis on the effect that controllable conditions of learning have in molding behavior, and the concern with accurate statistical evaluation provided Social Efficiency educators with an ideal tool. Behavioral psychology, as first interpreted by John B. Watson (1878–1958) and Edward L. Thorndike (1874–1949) and later reinterpreted by B. F. Skinner (1904–1990), was rapidly accepted as the psychological base of the Social Efficiency ideology.

By the late 1960s, cognitive psychology began to replace behavioral psychology. However, most of the assumptions underlying the behavioral psychology that mid-20th-century Social Efficiency educators used continue to be relevant to Social Efficiency endeavors in the 21st century. Social Efficiency cognitive psychologists working on curriculum design emphasize that "the modern information-processing approach in cognitive psychology would recommend careful analysis of the goals of instruction" and "decomposing knowledge into its elements for purposes of study and decontextualizing these elements for purposes of instruction" (Anderson, Reder, & Simon, 1996, p. 1); that "learning requires a change in the learner, which can only be brought about by what the learner does" (p. 13); that "learning is strongly influenced by the sequence of stimuli and the feedback that tells the system when responses are correct, and when they are wrong" (p. 12); and "that real competence only comes with extensive practice" (p. 12).

Scientific Methodology

"Scientific methodology" became popular in education at the beginning of the 20th century. It referred to the methodology of technology and connoted a collection of techniques such as statistics, accurate measurement, task analysis, efficiency engineering, and industrial management (Parker, 1912; Taylor, 1911). Social Efficiency educators adopted scientific methodology both as a reaction against the existing inefficiency of education and in alliance with the successful use of "scientific techniques" in the business and industrial worlds. At the beginning of the 20th century, Bobbitt modeled his "scientific methodology" after "scientific management" in the world of material production. In the middle of the 20th century, Gagne derived his approach to "scientific methodology" from his training in task analysis as a behaviorist psychologist. And in the 1970s, Lessinger modeled his approach to "educational engineering" after successful scientific and technological endeavors of the aerospace industry (St. Pierre, 2006, p. 240).

As we enter the 21st century, "science" continues to be a magic word for Social Efficiency educators: "The fundamental idea is that better science will make better

schools—that 'quality' science will enable us to finally reengineer schools so they work" (St. Pierre, 2006, p. 240). Heavy use of statistics, technology, and measurement, along with faith in man's ability to comprehend the complexities of what goes on in schools through objective assessment, underlies both the accountability and standards movements and many of the ways in which these two movements interact. For example, the use of statistical analysis of standardized tests scores to pressure educators to improve student, teacher, school, and state educational performance (in ways that are aligned with state content standards) is derived both from beliefs in scientific methodology and scientific approaches to organizational management. For example, the No Child Left Behind Act has "111 references to 'scientifically-based research'" (Feuer, Towne, & Shavelson, 2002, p. 4). Social Efficiency educators also continue to be attracted to the scientific procedures of cognitive psychology. They continue to assume that prestige and usefulness are automatically accorded their work if they use "scientific" techniques.

A Century of Forgetting

Social Efficiency educators at the beginning of the 20th century believed that the client for whom they worked was society. Their focus was on the preparation of the individual for a balanced and constructive life in society. Part of the initial impulse underlying the development of the Social Efficiency ideology was a reaction against education's servitude to special-interest groups—particularly "the dictation of the special predilections of selfish academic interests" (Bobbitt, 1924c, p. 49). Education was to serve society as a whole.

Things changed as time passed and Social Efficiency educators discovered the difficulty of drawing comprehensive objectives from society. By the middle of the 20th century, the clients for whom Social Efficiency educators worked became any group desiring their services. For example, Gagne, a strong Social Efficiency advocate, worked for the American Association for the Advancement of Science to develop the curriculum *Science: A Process Approach.*

By the beginning of the 21st century, with the rise of the standards and accountability movements, there was a further shift of emphasis from fulfilling social needs to what Bobbitt called raising the "qualitative and quantitative standards" that determined the products of schools. The shift involved taking as a given the academic standards and programs condoned by state departments of education; determining the degree to which those standards were being met and those programs were successful by using accountability measures based on decontextualized testing of student acquisition of atomized academic content inherent in those standards and programs; and emphasizing that high standards be used to assure that the academic goals of state standards and curricula were met, that academic achievement was promoted, and that "no child is left behind" (The Teaching Commission, 2004) as states "race to the top" in promoting student academic achievement. As a result, the raising of student academic performance became the terminal objective of Social Efficiency educators, and they began serving the very same special-interest groups ("of selfish academic interests"

promoted by advocates of the Scholar Academic ideology) from which Bobbitt and the early Social Efficiency educators desired to free education.

In only a century the Social Efficiency ideology forgot its anger over academia's domination of the school curriculum and came to embrace the academic interests that controlled the school curriculum. In the transition, this original socially oriented curriculum development system became an academically oriented curriculum development system and its major client became the academic disciplines.

Accountability Movement: From Educational to Administrative and Political Initiatives

The 21st century accountability movement—as illustrated by the Race to the Top Fund and its predecessor, the No Child Left Behind Act—provides an example of how an educational ideology concerned with issues of curriculum and instruction can be transformed into a political movement based in administrative (rather than educational) agendas, for the current "accountability [movement] is not primarily a pedagogical movement. It is an administrative system, and as such it is impervious to . . . educational concerns" (Martin, Overholt, & Urban, 1976, p. 32).

Precursors of today's accountability movement exist. The English "payment by results" method of administering education (1862–c. 1892) rewarded educators whose students performed well on standardized tests (Coltham, 1972). The efficiency movement within educational administration early in the 20th century was the first American attempt at imposing "scientific" industrial accountability methods on schools (Callahan, 1962). It elevated "budgetary values over education concerns" (Martin et al., 1976, p. 38).

The current accountability movement "seems so reasonable and simple. You specify the changes in learners that should result from schooling. You evaluate the extent to which the changes have taken place. You use the results of the evaluation to improve the schooling process" (Anderson, 2005, p. 103). This viewpoint follows the Social Efficiency ideology with only a few changes in emphasis:

First, there is increased emphasis on accountability to taxpayers who pay for education: "Schools, like other sectors of our society, are accountable to the public for what they do—or fail to do" and "taxpayer[s] . . . have a right to know what educational results are produced by a given expenditure" (Lessinger, 1970, pp. 3–4). In other words, the public deserves information related to student performance, teacher effectiveness, school efficiency, the school district's annual progress in meeting goals, and the state's progress in providing "guaranteed acquisition of basic skills by all of our children" (p. 12). To demonstrate accountability, educators should provide taxpayers with an annual report card on school effectiveness that describes changes in student achievement on standardized tests that reflect national, state, or local curriculum standards and that "relate learning to its cost" (p. 9) in terms of "measurable relationships between dollars spent and results obtained" (Lessinger, 1971, p. 8). "Independent auditors" should create the tests using scientific procedures to accurately reflect changes in student performance, and they should be designed and administered in a way that eliminates "bias resulting

from race, ethnicity, sex, or income" (Fenstermacher, 2001, p. 333). Teachers (and school officials) should be held accountable for their students' performance on the tests.

Here, it is assumed that (a) curriculum standards reflect the educational aspirations of the taxpayers to whom educators are accountable, (b) curriculum standards include everything children need to learn in school, (c) school curricula reflect "curriculum standards . . . [that] are simply mandated objectives . . . that teachers are expected to teach regardless of how important the teachers themselves believe them to be" (Anderson, 2005, p. 104), (d) standardized test questions reflect the content of curriculum standards, and (e) learning consists of a change of learner behavior that can be easily assessed by standardized tests.

Second, the accountability movement emphasizes that the educational effectiveness of teachers, schools, school districts, and states rests solely on measurable gains in student test scores resulting from teachers' instructional endeavors. It is assumed that teachers are the only ones responsible for and contributing to the education of children and that children's education is entirely under the control of teachers. This deterministic view of direct causes and effects excludes the effects social and economic factors outside the classroom have on children's education.

Third, it is emphasized that "data-based decisions" based on the annual report card of student, teacher, school, school district, and state curriculum effectiveness should "drive" (Hanson, Durton, & Guam, 2006, p. 18) a process of "educational engineering" (Lessinger, 1970, p. 12) that uses "modern management and budget techniques" (Fenstermacher, 2001, p. 333) "currently employed by business and industry" (Lessinger, 1971, p. 7) to shape the behavior of all involved in children's education in our public schools by the distribution of "penalties and incentives" (Lessinger, 1970, p. 35), both in the form of tax dollars and public recognition of achievement or failure.

Fourth, it is emphasized that "full disclosure of information to all parties regarding school effectiveness" (Fenstermacher, 2001, p. 333) based on aggregated student test scores will pressure states, school districts, schools, teachers, and students to focus intently on preparing students to perform well on standardized tests that assess their achievements. Here is where political pressure (in terms of competition among schools, school districts, and states and in terms of parental and community pressure to provide children with an adequate education) and economic pressure (in terms of competitive seeking of monetary rewards for student achievement) come into play. Here the political and economic agendas of the accountability movement tie all of public education to the rights of taxpayers both to know the results of their tax expenditures and to determine how their tax dollars are spent.

Fifth, it is emphasized that society can be maintained and improved through this administrative approach to education. This is because children who succeed in this system will be prepared to function as adults in the jobs which provide our nation's economic foundation, since curriculum standards reflect the skills needed for full adult participation in jobs at varying levels of employment.

Discussion of the Social Efficiency ideology will now shift from examining the context in which educators' work to examining the concepts that mold their view of curriculum.

Aims

Social Efficiency educators consider their aim to be the efficient carrying out of a task for a client. In fulfilling this aim, they see themselves as educational engineers who design and implement educational programs that shape the behavior of people in much the same way as industrial engineers design and manufacture railroad rails from steel. This analogy involves the assumptions that the educational engineer and the industrial engineer both obtain their tasks from a client; both are evaluated by the ability of their product to fulfill the needs of a client (both are accountable to a client in the final analysis); both use a precise, particularized, and atomistic approach to accomplishing their purposes; both plan with a high degree of care and explicitness; both pay rigorous attention to empirical events and standards; both value sophisticated use of scientific techniques; and both take a programmatic approach to transforming their raw material into a finished product.

Whether the task Social Efficiency educators engage in is the discovery of terminal objectives, the design of a sequence of progressive objectives, the creation of learning experiences, or the construction of standards for assessing performance, their aims are not directly associated with the content of the curriculum per se, but rather with the efficient and effective design and implementation of the curriculum and the resulting student achievement. Their vested interests are not as much in what is achieved as in *how well* it is achieved, and they are more concerned about the means of accomplishing the ends than they are about the ends themselves. The criterion used to assess their endeavors is efficiency, whether they are designing curriculum ("Activity analysis seeks to discover the quite specific types of human activity which men should perform efficiently" [Bobbitt, 1924c, p. 45]), determining how to best perform an activity ("The business of education today is to teach growing individuals . . . to perform efficiently those activities which constitute the latest and highest level of civilization" [Bobbitt, 1926, p. 1]), or facilitating learning ("Such a procedure should, if systematically followed, bring about the required learning in the most efficient possible manner" [Bobbitt, 1926, p. 1]).

Knowledge

The knowledge most valued by Social Efficiency educators has two characteristics. First, it is by nature a capability for action that can be taught to learners. Second, its identification and its worth demand the acceptance of the duality of subjective and objective reality.

The Nature of Knowledge

Knowledge is a capability for action identifiable as the "successful performance of a class of tasks" (Gagne, 1962, p. 355). It is a skill. It is something that a person can learn to do.

Knowledge is defined in behavioral terms. Social Efficiency educators equate such things as "knowledge," "wisdom," "insight," and "understanding" with behavior. This is

partially because the only tangible evidence we have of knowledge, wisdom, insight, and understanding is behavioral evidence, and partially because the only way to determine whether or not people "know" or "don't know" something is to see how they behave in certain situations.

The emphasis on the behavioral interpretation of the nature of knowledge results in a corresponding deemphasis on the informational interpretation. The possession of the correct *behavior* is emphasized over the possession of the correct *information.* There is certainly a relationship between having the necessary information to act and being able to act, between "knowing that" and "knowing how." However, for Social Efficiency educators, the ability to act is more important than the ability to be informed. For example, in the debate over whether it is more important "to understand" or "to do" mathematics, Social Efficiency educators, while not denying that both are important, will always behave as though acquiring mathematical "skills" is more important than acquiring an "understanding" of mathematics. Bobbitt (1924c) speaks of this in comparing the "old education" with the "new functional education." He writes that, according to the old education, "the well educated man is to be defined as a walking body of knowledge. The more swollen the bulk of information that he carries about with him, the better educated he is" (p. 45), whereas within the new functional education, "man is not a mere intellectual reservoir to be filled with knowledge. He is a creature of . . . *action.* His most salient characteristic is not his memory reservoir, whether filled or unfilled, but *action, conduct, behavior*" (p. 46). Gagne (1966) supports this behavioral versus informational interpretation when he writes, "The most striking characteristic of these materials is that they are intended to teach children the *processes* of science rather than what may be called science content" (p. 49) and

> that an emphasis on process implies a corresponding de-emphasis on specific science 'content.' . . . [C]hildren . . . are not asked to learn and remember particular facts or principles. . . . Rather, they are expected to learn such things as how to observe . . . and how to perform experiments. (AAAS, Commission on Science Education, 1967b, p. 3)

Some confusion exists regarding the behavioral interpretation of the nature of knowledge. For example, are the facts of Newtonian mechanics knowledge? For Social Efficiency educators, information alone is not knowledge. By itself, the possession of information by an individual does not mean that the individual possesses knowledge. However, the ability to state a fact when appropriately stimulated does fall within the behavioral context. The ability to act in accordance with the ability to state a fact falls even more within the behavioral context. The relevant criterion is whether the possessor of information is capable of acting on the knowledge represented by the information.

Let us take, for example, the case of knowledge about "honesty." It is one thing to have memorized what society considers honest behavior. It is another thing to be able to state what society considers honest behavior. But it is another thing yet to be able to act in an honest manner. It is the ability to act in the appropriate manner which Social Efficiency educators call knowledge, rather than the ability "to know," "to understand," or "to appreciate" what the appropriate behavior should be. What is in peoples' heads

is not as important in the Social Efficiency ideology as the ability to translate what is in peoples' heads into behavior in which they engage.

Social Efficiency educators also believe that knowledge can be atomized, or broken up into specific unitary behaviors: that "large tasks decompose into nearly independent subtasks" (Anderson, Reder, & Simon, 1996, p. 3). Activity analysis is the method of decomposing knowledge into specific atomistic elements and is one of the major components of the Social Efficiency approach to curriculum design. A consequence of atomism can be seen in the debate over using a "phonics" versus "whole language" approach to reading instruction. While not having to deny that both approaches are of value, Social Efficiency educators emphasize the phonics approach, in which words are decomposed into groups of letters, which in turn are decomposed into individual letters (each of which is an atomistic unit with a sound associated with it). This approach may be compared to the whole language approach, in which comprehensive meaning is emphasized.

One consequence of Social Efficiency educators' conception of themselves as instruments in achieving the ends of a client needs mention. The educator is concerned about the means of achieving the ends more than about the ends themselves, about the means of achieving knowledge more than about knowledge itself, and about learning more than about knowledge. As a result, Social Efficiency educators pay more attention to learning than to knowledge. In many ways they view knowledge from the perspective of learning. Thus, they are more likely to write about *The Conditions of Learning* (Gagne, 1965b) than they are about the conditions of knowing and are more likely to speak about the nature of learning than they are about the nature of knowledge.

Knowledge and Objective Reality

Social Efficiency educators accept the duality of subjective and objective reality, and they believe that objective reality is the more significant of the two. Accordingly, they deal with their world as an empirical entity. Behavior which cannot be observed or measured is treated as though it does not exist—more to be ignored than denied. Attention is directed toward those aspects of reality that can be observed. That which cannot be observed, such as some of the "spiritual" dimensions of people's being, is simply not dealt with.

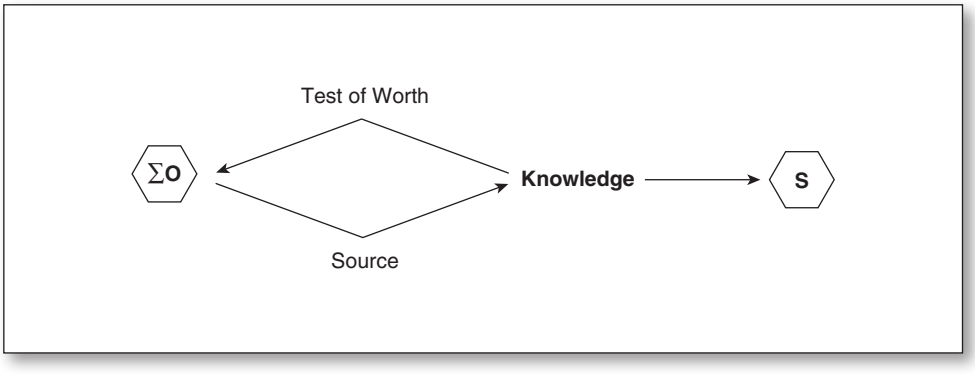
Curriculum knowledge has its origin in the objective reality of a client population—in the normative aspects of a particular social group—and is discoverable by taking a numerical count of the needs of the majority of the members of that group.

Knowledge derives its value from its ability to fulfill needs in the objective world of mankind. Its worth is determined by the consequences that can result from its possession. As such, curriculum knowledge is identified by evaluating the potential consequences of its possession on those who possess it and the society in which they function. The important criteria for identifying worthwhile knowledge are not the insights into themselves that the possessors derive from its possession or the sources from which the knowledge is derived, but rather the power such knowledge gives curriculum clients to fulfill their needs and the power it gives those who possess it to

fulfill their own needs by fulfilling the needs of the curriculum client. If something furthers the client's aims, it is worthy of inclusion in the client's curriculum.

This view of knowledge is represented in Figure 3.2. Knowledge has its source in the normative objective reality of members of a curriculum developer's client population (ΣO where Σ represents the normative aspect of objective reality, O). Knowledge's worth for inclusion in curriculum is tested by determining the consequences that result from its possession by the client population. Once curriculum knowledge is determined, learners (S) can acquire it.

Figure 3.2 The Social Efficiency process of obtaining curriculum knowledge.



Learning

Learning is a central concept in the Social Efficiency ideology and is synonymous with change in behavior.

> Learning exhibits itself as a change in behavior[;] . . . the inference of learning is made by comparing what behavior was possible before the individual was placed in a "learning situation" and what behavior can be exhibited after such treatment. (Gagne, 1970, p. 3)

In other words,

> a learning event . . . takes place when the *stimulus situation* affects the learner in such a way that his *performance* changes from a time *before* being in that situation to a time *after* being in it. The *change in performance* is what leads to the conclusion that learning has occurred. (Gagne, 1970, p. 5)

Learning is not viewed in terms of the natural growth or development of children, societal acculturation or socialization of children, or filling the minds of children with information. It is viewed in terms of changes in the observable behavior of learners, of training learners to perform specific activities.

A Behavioral Viewpoint

The learning theory used by Social Efficiency educators is essentially that of behavioral psychology. This may seem strange, for by the late 1960s cognitive psychology began to replace behavioral psychology in the field of psychology. However, the changes were evolutionary and, from the point of view of Social Efficiency educators, enriched the previously accepted tenets of behavioral psychology rather than refuted them (Anderson et al., 1988, p. 227).

For the Social Efficiency ideology, the development from behaviorism to information processing and cognitive psychology "was an awakening to the complexity of human cognition" (Anderson et al., 1996, p. 10) accompanied by postulation of the existence of "mental structures and processes" (Anderson et al., 1988, p. 228). Now, rather than having to consider the mind a black box about which nothing could be assumed, educators could posit the existence of mental structures and processes of thought (such as long-term memory, working memory, and schemas). Now they could offer explanations for how children learn and what happens between the time children are exposed to stimuli and the time they respond. However, the explanations of what happens in children's brains did not significantly affect the way Social Efficiency educators treated learning while they developed and used curriculum. They have continued to treat learning in essentially the same way as they did while using behaviorism, for changes in psychological *theory* have not yet significantly impacted curriculum *practice.*

The emphasis in the learning theory utilized by Social Efficiency educators is not on the learner, but on the stimuli which cause the learner to change (S), the responses which indicate that the learner has changed (R), and the relationships between the stimuli and responses which account for the transformation which takes place within the learner ($\rightarrow$). The stimulus situation (S) is of primary importance, because it can be controlled and deliberately manipulated by educators to produce the desired learning in the student; it is "*outside the learner* and can be identified and described in the terms of physical science" (Gagne, 1970, p. 6). Therefore, it is the focus of educators' attention while they are developing curriculum. The behavioral responses (R) are the specific acts which can be identified as occurring as the result of learners' exposure to the stimulus situation (S). They are what indicate to educators whether or not the student is learning and whether learning experiences (S) are producing the desired results. They can be observed in a learner's behavior. The relationship between the stimulus and the response ($\rightarrow$) represents the transformation that takes place within the learner. It tells educators how to get the results they desire. "The learning change is from stimulus $\rightarrow$ (nothing) to stimulus $\rightarrow$ response" (p. 6). The Type to Learn program discussed earlier provides an example of these elements. The presentation to the learner of a letter in either visual textual or verbal auditory form is a stimulus (S). The typing of the letter by the learner is the response (R). The relationship between the stimulus and the response may be postulated to be the activity within working memory of the dual linguistic and graphic subprocessors (Baddeley, 1986), which allow the learner to associate sight of the letter (by the

graphic subprocessor) or the sound of the letter (by the linguistic subprocessor) with the action of typing the letter. It may be postulated that when a learner is just beginning to learn, it takes working memory considerable effort to produce the connections between S and R that produce the desired response. Once learning has been automated and schemas have been formed in long-term memory, the connection between stimulus and response (→) is automatic and the desired typing skill has been learned (Chandler, Cooper, Pollock, & Tindall-Ford, 1998).

Note in this example that, under the behavioral psychology of the 1960s, nothing would have been said about the nature of the connection between S and R, because they would not have been able to be directly observed. Note also that, for all practical purposes, the nature of the connections currently postulated are irrelevant to most of the instructional designs of Social Efficiency educators. During curriculum and instructional design, educators focus on analysis of the skill to be learned, division of the skill into its component tasks, design and sequencing of learning experiences (S) that result in the desired response (R), and assessment of whether or not learning has taken place (R). During Social Efficiency educators' administrative and political (accountability) endeavors, they focus on making sure curriculum standards have been satisfactorily met by publicly reporting student achievement test scores (S) in order to shape teacher behavior (R) so that teachers more directly teach to the standards.

Assumptions About Learning

Several assumptions about the Social Efficiency view of learning need elaboration.

First, learning is an active process and "only the active learner is a successful learner" (Anderson et al., 1996, p. 18). That is, "learning requires a change in the learner, which can only be brought about by what the learner does" (p. 13). Learners must make the responses they are to learn. They learn what they do. This refers to Bobbitt's "functional education," in which learners must practice the behaviors they are to acquire or make the responses they are to learn—that is, learn to function by functioning in the desired manner. (For example, students learn to type by actually typing.) Skilled performance develops only as a result of "learning-by-doing," during which "cognitive structure accommodates to experience" (p. 13). It is learners who shape their behavior (and schema) in accordance with the requirement of the curriculum (its stimulus, reinforcement, and response conditions), not the curriculum that shapes the learner.

Second, learning skills requires practice: "Real competence only comes with extensive practice" (Anderson et al., 1996, p. 12). The stimulus → response connection is strengthened with practice. (For example, in running the Type to Learn curriculum, students engage in many activities that allow them to practice typing.) One must be careful with the types and amount of practice required of learners: "The instructional task is not to 'kill' motivation by demanding drill, but to find tasks that provide practice while at the same time sustaining interest" (p. 13).

Third, "learning is strongly influenced by the . . . feedback that tells the system when responses are correct, and when they are wrong" (Anderson et al., 1996, p. 12),

and learning progresses as correct responses to specific stimuli are reinforced. This assumption refers to Thorndike's law of effects (or Skinner's contingency of reinforcement theory) and pertains to the belief that the way to get learners to acquire a behavior is to arrange the conditions in which they learn so that they are immediately rewarded or given reinforcement when they emit the desired behavior. There are three component assumptions making up this belief: (1) correct responses are strengthened by being followed by immediate reinforcement, (2) incorrect responses are weakened by not being followed by a reward, and (3) complex behaviors are built up gradually through the reinforcement of prerequisite behaviors that gradually approximate the desired terminal behavior. (All three assumptions are embedded in Type to Learn.)

Fourth, acquiring skilled performance requires that responses to stimulus conditions be put under the control of particular stimuli in such a way that these stimuli automatically generate the responses. This refers to the Social Efficiency belief that, to be "efficient," a learned behavior must become so ingrained that the learner responds automatically and in a predetermined manner to the presence of specific stimuli—without the contemplation or internal thought processing in working memory that typically occurs when a behavior is just being learned (as in Type to Learn).

Fifth, Social Efficiency educators assume learning is atomistic. This shows up in their concern with devising specific stimulus conditions that will condition the learner to emit specific behavioral responses (as in Type to Learn). Associated with this is the assumption that the total learning of a child with respect to a complex task is a summative accumulation of specific learnings associated with that task. Activity analysis, during which knowledge is decomposed, uses this assumption.

Sixth, there is the assumption that not all learning is of the same level of complexity: "Most complex skills are hierarchical in structure, with component skills within component skills, and so on" (Anderson et al., 1996, p. 18). Curriculum developers both derive unitary actions to be learned and define the hierarchical relationships among those actions during activity analysis.

Readiness

Social Efficiency developers are primarily interested in learning versus growth. As Gagne (1970) says, "learning is a change in human . . . capability which . . . is not simply ascribable to the process of growth. . . . [I]t must be distinguishable from the kind of change that is attributable to growth" (p. 160).

As a result, these educators reject readiness arguments based on developmental perspectives. "Readiness" to undertake learning is viewed as a function of the presence or absence of the necessary prerequisite learnings. Gagne (1970) phrases it this way:

> The acquisition of knowledge is a process in which every new capability builds on a foundation established by previously learned capabilities. The convenient escape mechanism that the student is not 'mature' enough to learn any particular content needs to be studiously avoided, since it is valid for only the very earliest years of life. A student is ready to learn something when he has mastered the prerequisites. (pp. 26–27)

Thus, "at any given age, a child may be unable to perform a particular intellectual task because he has not acquired the specifically relevant intellectual skills as prerequisites to that task" (p. 290). However, "such learning may be readily accomplished if the learner has acquired, or will undertake to acquire, the intellectual skills prerequisite to the task" (p. 290). In particular, it is assumed that "children can learn any intellectual thing we want them to learn, provided they have learned the prerequisites" (p. 300). In terms of Figure 3.1, for example, when learners are competent in tasks C and D, they are ready to learn task A. Until they are competent in tasks C and D, they are not ready to learn task A.

Partitioning learning apart from growth and conceiving of learning as atomistic in nature raises the question of what the relationship between the learning required by a curriculum and the self-evolving nature of the child's life is. That is, how is the organic life series within the child united or meshed with the atomistic learning series of the curriculum? The concepts of transfer, curriculum integration, and curriculum continuity are used to account for the relationships between the parts of the atomistic curriculum and the organic life of the child. Transfer refers to generalizing specific learnings so that they will be useful to the learner in contexts other than the specific situations in which they are acquired. Lateral transfer "refers to a kind of generalizing that spreads over a broad set of situations of roughly the same level of complexity" (Gagne, 1970, p. 335). It involves the integration of (a) learnings that take place within a curriculum and activities that take place in the learner's everyday life and (b) learnings within separate curricula that the learner is simultaneously experiencing. Vertical transfer "refers to the effects that learned capabilities at one level have on the learning of additional ones at higher levels" (p. 335). It promotes continuity by providing for (a) the natural flow of learning from activity n to activity $n + 1$ and (b) the revisitation of related learnings at several different levels of complexity.

The Child

Lack of Concern

Social Efficiency educators show little concern for the child per se while developing and using curricula. When they do show concern for the child, it is not concern for the person but for the potential adult who possesses behavioral capabilities and can provide an energy input into the educational endeavor (Gagne, 1966, p. 51).

Children are not viewed as entities who of themselves have meaning. Instead, they have meaning because they can develop into adults and can serve their society. They are first members of society capable of fulfilling social needs and only secondarily individuals with needs. They are first potential adult members of society—"the man within the child"—and only secondarily children. They are first bundles of action capabilities and only secondarily persons possessing the ability to act.

If a distinction is made between the *acts* of a person and a *person* acting, it is the former, not the latter, with which Social Efficiency educators are primarily concerned. They are interested in the *activity* people engage in rather than *the person* engaged in activity. People and their attributes are dichotomized in a manner similar to the way

objective and subjective reality are dichotomized, with emphasis being placed on the attributes of people in contrast to people themselves.

Educators conceive of their endeavors as contributing to the next stage of development of the child. They are constantly working on activity n so that activity $n + 1$ can be accomplished and constantly thinking of children learning capability n so that they will be able to learn capability $n + 1$ in the future (where n is a positive integer). Educators' concern is always the future learning of the child rather than the present growing of the child.

The Child as a Worker

Within the Social Efficiency ideology, children are viewed as workers capable of providing energy inputs into the educational endeavor:

> Looking at a school system as a large organization of individuals for the purpose of turning out certain necessary human products, the pupils are in fact the ultimate workers. They are the rank and file over whom the teachers stand in supervisory capacity. The work is a development of the potential abilities which the pupils carry around within themselves into actual abilities of a given degree. These actual abilities are the educational products. It is the work of the student, not the work of the teacher, that produces these products. (Bobbitt, 1913, p. 32)

From this perspective, children are the ones who do the work in school. They provide the energy inputs that work to transform them into suitable educational products. They know what work to perform on themselves and the standards they must reach because of the supervision given by teachers and curricula.

Individualized Programmed Instruction

The stance of Social Efficiency educators toward individualized programmed instruction highlights both of these points. First, individualized programmed instruction is designed to help children achieve a set of standard capabilities, to teach *tasks* rather than *students*. It deals with a very limited part of children's total functioning; it is not intended to give students a complete, well-rounded education but to provide them with a set of specialized skills. Second, instructional materials sit idle until they are activated by students. Children provide the primary energy input that takes them through the materials, which educate them at a rate proportional to the amount of energy they expend on learning.

Teaching

Role of the Teacher

The teacher's job is to make sure that learners appropriately work through curricula and acquire their terminal performances. "The teacher is the *manager of the conditions of learning*" (Gagne, 1970, p. 324) who both prepares the learning environment for learners and supervises their work in that environment.

Part of the teacher's job is to prepare the environment in which students learn (do their work on themselves). This consists of doing whatever is necessary to prepare the curriculum for use by students. Once students engage the learning environment, the teacher's job is to supervise student work, much as the manager of an assembly line supervises the workers on the assembly line. As Bobbitt phrases it,

> the teacher is supervisor, director, guide, stimulator, of the rank and file of the workers [students] in order to bring about on the part of the latter the development of these various abilities. The teaching problem is in fact a supervisory problem at the first level. (1913, p. 32)

> In a school system . . . the pupils are the ultimate workers . . . [and] teachers rank as foremen. It is their business not to do the work that educates, but to get it done by the pupils. In doing this, they must know the pupils: know their varying mental capabilities, their interests, their aptitudes and abilities, their states of health, and their social milieu. They must know how to arouse interest; how to motivate them from within; how to adjust the conditions of the work to child-nature; how to keep up an abundant physical vitality in the children; and how to employ community influences for vital stimulation of the pupils. (1918, pp. 84–85)

Managing, directing, and supervising student work involves guiding them, motivating them, and assessing them. Guiding students (as workers) involves indicating to them what they are to learn (the work they are to do). In guiding students, the teacher must be knowledgeable of the students and the curriculum so that appropriate help can be given to students as needed.

Motivating students (as workers) involves knowing them and appropriately interacting with them in such a way that they become persuaded to work through the curriculum and acquire its competencies.

Assessing students involves monitoring students' work as they progress through the curriculum and maintaining quality control so that they acquire all of its prerequisite and terminal competencies.

The job of teaching is to fit the student to the curriculum and fit the curriculum to the student. It involves stimulating students to run the curriculum and adjusting the curriculum to the capabilities of students. This entails knowing students and taking into account their idiosyncratic natures. The curriculum developer designs curriculum for a standard student; the teacher makes adjustments for particular students.

Consequences

There are three important consequences of this view of teaching.

First, the teacher's role as manager, similar to that of a foreman managing an assembly line, removes the teacher from having any input in determining the ends toward which the student's work is being directed or the learning activities in which students engage. Teachers are not to question the ends or means of the curriculum or implement their own ends or the ends of children in their care. Thus, although teachers' functions are different from those of curriculum developers, teachers are considered instruments of ends other than their own in the same way curriculum developers

are. That is, teachers are instruments who implement curriculum created by developers, developers are instruments who create curricula to fulfill client needs, and, thus, teachers are instruments who fulfill client needs.

Second, excluding teachers from designing curricula to meet the idiosyncratic needs of their students has the effect of guaranteeing that "a 'quality control' of the choice of instructional conditions is insured and maintained" (Gagne, 1970, p. 325). That is, allowing only curriculum developers to design curricula guarantees to the greatest degree possible that the "ultimate product" resulting from the educational process will measure up to the "definite qualitative and quantitative standards" required to fulfill the needs of the curriculum client by making sure that "quality does not suffer from variations in teachers' skills" (p. 332). But this also produces a standardization of educational processes and products and an inhibition of classroom flexibility, responsiveness, and innovation.

Third, "the objective of this management [teaching] is to insure that learning will be efficient, that is, that the greatest change in the student's behavior will occur in the shortest period of time" (Gagne, 1970, p. 325). Teaching is evaluated in terms of both student achievement and the efficiency with which the teacher produces student achievement rather than in terms of how humane, creative, enlightening, or insightful it is. When this is taken in combination with the emphasis on providing students feedback during learning, it should be no surprise that one of the recommendations of the current accountability movement is that teachers should "be measured and compensated [as part of their salaries] based on their classroom performance, including the academic gains [amount of learning produced over a specified period of time] made by their students" (The Teaching Commission, 2004, pp. 10–11). This includes using a "value added" (The Teaching Commission, 2004, p. 27) method to assess "the rate of improvement in student performance each year, as measured by state tests" and basing "a significant percentage of teachers' total compensation on improvements in student performance" (p. 26). This is consistent with the Social Efficiency view of learning, for

> our failure to link pay to performance [stimulus to response] . . . removes the possibility of reward for success and accountability for failure [reinforcement through reward or punishment]. Until teachers are rewarded and given responsibility for what really matters—their impact on student achievement—we cannot expect to see a marked change for the better in student performance [learning]. (The Teaching Commission, 2004, p. 23)

Evaluation

Reasons for Evaluation

Within the Social Efficiency ideology, it is essential to assess curricula, learners, and teachers. Key concepts during evaluation are accountability and standards. There are five primary reasons why evaluation is important in the Social Efficiency ideology.

First, educators conceive of themselves as instruments who fulfill the needs of a client. They hold themselves accountable to their clients, and they demonstrate their accountability by evaluating the efforts of curriculum developers and teachers to

produce evidence that the needs of the curriculum client have been fulfilled. To assess their efforts, developers evaluate their curricula to demonstrate that terminal objectives have been achieved. To assess the endeavors of teachers, individual schools, school systems, and states, aggregated student achievement—as determined by standardized tests—is used to provide evidence of success, failure, or annual yearly progress toward meeting curriculum standards.

Second, Social Efficiency educators see their endeavors within the mainstream of science. One aspect of the scientific endeavor is conceived to be the demand for reproducibility, validity, reliability, and proof. As such, educators believe they must use evaluation in order to demonstrate that their endeavors possess these qualities and are therefore scientific. Mathematical and statistical procedures are viewed as powerful scientific tools, and they are used on individual or aggregated standardized test scores to "scientifically" determine educational success or failure of students, teachers, individual schools, school districts, states, and the nation as a whole.

A third reason why evaluation is important in the Social Efficiency ideology is related to the nature of sequenced progressive objectives, which represent the sequence of unitary learnings children must acquire one by one to move from incompetence to competence. Learners' mastery of each progressive objective in its turn guarantees that they will reach competence. Their performance must be continually monitored and evaluated to ensure that they do not proceed to successive objectives before mastering previous ones.

> [A] primary reason for direct measurement of the outcomes of a learning exercise session is to insure that instructional objectives have been met. If a student fails to exhibit the performance required on such a test, he needs to undertake additional learning covering the same ground. It is inefficient, even useless, for him to try to proceed to the learning of advanced topics, in view of the hierarchical nature of knowledge. . . . [T]he defined objective must somehow be achieved if subsequent learning is to be even minimally efficient for this student. (Gagne, 1970, pp. 342–343)

A fourth reason why evaluation is important has to do with the effect that feedback has on children's endeavors to learn. It is believed that the results of evaluation constitute an important source of feedback to learners that helps them appropriately shape their behavior, whether the feedback (and the accompanying rewards or reinforcement) is positive or negative. The same holds true for teachers, individual schools, school districts, states, and the nation as a whole.

The fifth reason why evaluation is important is related to the role of standards in assessing students, teachers, and school systems. Teacher tests certify that teachers meet certain standards and are qualified to enter the classroom. In many states, student achievement tests certify that students are qualified to graduate from high school because they meet certain standards. Under the Race to the Top Program, and its predecessor the No Child Left Behind Act, the results of aggregated student testing viewed in the light of specific standards determine whether or not schools should be certified as achieving or underachieving.

The Nature of Evaluation

Social Efficiency evaluation involves comparing a curriculum, student, or teacher to a predetermined standard through the use of criterion-referenced tests. Such comparisons are made with respect to criteria decided on before evaluation takes place. Evaluation does not involve comparisons that depend on population norms discovered during or after testing. As Gagne (1970) says, evaluation's "purpose is to compare each student's performance with an external standard representing the defined objective" (p. 342).

The data obtained from evaluation come in a "pass or fail" form, not a ranking form. The important thing for evaluation of students and teachers is whether they pass or fail their tests and thus whether they meet certain standards, not that they are seventh or eighth from the top. The important thing for summative curriculum evaluation is whether the curriculum achieves the standards set for it, not how well it achieves them. The important thing for formative curriculum evaluation is decisions such as "the curriculum is acceptable" or "more refinement is needed."

Objectivity and Atomization

Two characteristics of evaluation need mention.

First, evaluation involves objective, unbiased measurement of objective reality. Two different perspectives on this are (1) that "accurate . . . assessment . . . requires . . . that the competence being tested for . . . be specified precisely without undue reliance on subjective judgment" (Anderson et al., 1996, p. 17) and (2) that "the outcomes of learning, the achievements of the learner, need to be assessed by an agent 'external' to the student, in order to ensure that they are objective and unbiased" (Gagne, 1970, pp. 27–28). Statistical assessment is the preferred type of evaluation.

Second, evaluation takes place within the context of atomization. The total learning or achievement to be evaluated is partitioned into specific atomistic events, each of which is evaluated separately. When each of the partitioned events is evaluated, it is examined in terms of characteristics inherent in the partitioned element. The question asked is whether or not the partitioned characteristics are present in the curriculum, child, or teacher, and whether they meet their respective standards.

Appropriateness of Evaluation

Three characteristics of the Social Efficiency ideology facilitate evaluation.

First, curriculum aims are stated as behavioral objectives that specify human performances. Behaviors are observable and thus easily measured.

Second, learning is conceived within the context of an identifiable change in behavior resulting from an identifiable stimulus condition. It is a change from the absence of a behavior to the presence of a behavior. Conceptualizing learning this way facilitates evaluation.

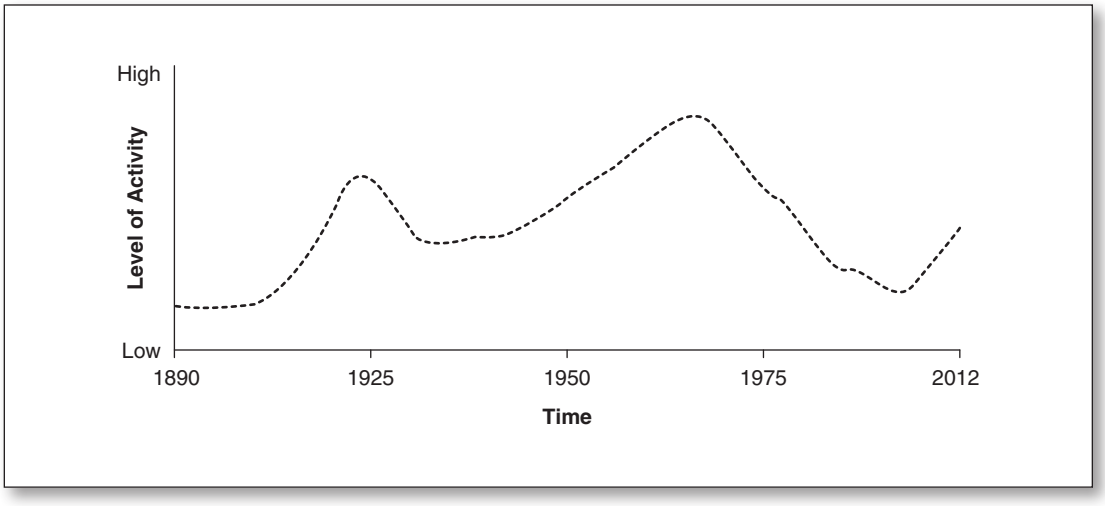
Third, the Social Efficiency conception of causation as deterministic facilitates evaluation. One must simply show absence of behavior, display a stimulus-response linkage, show the stimulus, and show the response to demonstrate that learning took place as the result of a specific intervention. If causation were not so direct and easily analyzable, evaluation would be more difficult.

Concluding Perspective

The Social Efficiency ideology has done much to make American education practical over the last century. Its insistence that education operate efficiently and accountably, prepare people for many years of productive adult life within society, and prepare them to perform useful skills rather than simply fill their minds with information, has done much to make American education relevant and useful. Its views that the most useful knowledge is the ability to perform skills, the teacher is a manager of classroom activity, the child is a doer, and educational objectives must be specified in terms of student performances, along with its broadening of our view of evaluation to include criterion-referenced testing, have done much to make schools more efficient, accountable, and relevant to the future lives of students. This is the ideology that has brought us behavioral objectives, behavioral management techniques, and objective quantitative research methods.

The Social Efficiency ideology first gained influence on American education during the last quarter of the 19th century and the first quarter of the 20th century with the rise of concern about utilitarian education (including agricultural education, manual training, industrial education, and vocational education). It became increasingly prominent during the second decade of the 20th century as a result of its influence on the field of school administration through the efforts of men like Franklin Bobbitt. It continued to gradually gain influence as it adopted the "scientific" statistical techniques of educational assessment and research. Ralph Tyler (with his systematic approach to curriculum and instruction) and behavioral psychologists (with the learning theory that was adopted by the ideology) did much to promote the Social Efficiency agenda in the middle of the 20th century. Between 1940 and 1980, Social Efficiency advocates became the major group of faculty teaching within schools of education and greatly influenced generations of teachers. With the rise of other ideologies in the last third of the 20th century, the replacement of behavioral psychology by cognitive psychology, and the replacement of Social Efficiency faculty in schools of education by those holding other ideologies, the Social Efficiency ideology declined in influence. At the end of the 20th century, as American society began to fear that the economic prominence of the U.S. might be eclipsed and the inefficiency and ineffectiveness of American education was made the scapegoat, the ideology again began to reassert its influence on education with its views on accountability, efficiency, and the federal Race to the Top funding and No Child Left Behind mandates. Figure 3.3 provides a rough estimate of those times when advocates of this ideology have been most active, with respect to their own norms, in attempting to influence American education.

Figure 3.3 Times of relative high and low activity of the Social Efficiency ideology.



Activities designed to extend what is written here and provide additional insight into the ideology are located on the SAGE website at www.sagepub.com/schiroextensionactivities.