

How do we Teach Students to Think?

Whatever else teachers may consider vital to their work, all aim to teach students to think. When asked to state their fundamental purpose, most teachers say that education deals with mental development. This idea has permeated the thinking of ancient scholars as well as moderns. We read in Plato that Socrates maintained that the unexamined life was unfit to live. Turning to John Dewey, we still find reflective thought and reasoning a central theme. Whenever elementary, secondary, or college teachers remove their minds from the immediate task of teaching history, spelling, or chemistry and ask, "What is this job all about? What am I trying to do for these young people and myself?", they seek fundamentals that go beyond the immediate task. Helping students to lead a reasoning, thoughtful life is certainly one of these fundamentals.

Granted, teaching students to think is one of the most important purposes of education; how is it done? As soon as this question is asked, difficulties arise. A complete answer must consider the nature of man, the nature of mind, and the mechanics of thought. Our libraries are filled with thousands of thick volumes on these subjects. Despite the infeasibility of giving a complete answer in a short space, the question can be clarified in a brief discussion. How has the average teacher approached this question?

THE TRADITIONAL CONCEPTION OF THINKING

Traditionally, educators have said that men naturally think. The ability to think differentiates man from the lower animals. Endowed with mind, men try to perfect their mental natures. Men learn to think through using native endowment, their minds. To accomplish this, those subjects that challenge thought take precedence. Thus, education emphasizes mathematics, logic, languages, the ancient and medieval philosophies, literary classics, the sciences, and history. Thinking develops as people associate with the thought-provoking problems drawn from the writings of famous scholars. The ability to reason, developed by studying classics, equips individuals to deal with everyday problems that require thought. Once developed, reasoning can be used in all fields. A logical mind readily adapts itself to any endeavor.

The preceding discussion of thought processes may sound convincing, but it represents enigmas that philosophers have wrangled over for centuries. This principal difficulty centers on the meaning of mind. What is the human mind? In the account given above, the mind is described as a natural endowment that develops when brought into association with lofty ideas. This explanation rests on unquestioned assumptions about mind that have puzzled philosophers for thousands of years. The following questions and statements show varying philosophic interpretations: Is mind a vital force that partakes of the essence of reality, some motivating energy within man that prompts him to intelligent action? Or is it confined to the brain and nervous system? If so, how does it work? How are

ideas perceived and transmitted from person to person? Some psychologists consider mind and consciousness a foolish anachronism that hangs on from medieval philosophy: an idea we can eliminate from our thinking, concerning ourselves with only behavior. Another view allies mind to an intelligence that prevails through-out the cosmos, a regulating force that controls the laws of nature.

THE MEANING OF MIND

These questions illustrate different philosophical viewpoints taken toward the meaning of mind. Although varying, they all contain a central theme as a sounding board. They have one thing in common. They have asked the same question: What is mind? Some say it does not exist; others attribute mental powers to diverse forces or mechanisms. Each, through different channels, reaching different conclusions, have sought the ultimate nature of mind. All cast their thought into the same arena, asking the perennial question, what is mind? Where does this mode of questioning lead? Philosophies that probe mind as existence dwell in the realm of shadowy speculation beyond the ken of scientific verification or refutation. What kind of an experiment, for example, can we conduct to verify the hypothesis that mind emanates from a universal force? Which is the better method for validating this hypothesis; reading tea leaves? Consulting the crystal ball? Radar? or Deductive logic? How far would science be today if scientists stopped their work until the questions, What is electricity? What is motion? Or what causes seeds to grow?, were answered? These questions place any investigation in the mysterious area of the unknown. Investigations conducted from these questions lead to interminable conflict. The vast body of controversial philosophic literature serves as witness to this fact.

If science conducted activities only from a consideration of such questions, the scientist would grope forever in the darkness of metaphysical bewilderment. Imagine a group of scientists working in their laboratories, refusing to carry on their studies until they knew all about the ultimate nature of electricity. Some might contend it is an attribute of water; others, friction from physical bodies; still others, that it results from cosmic forces. Thus, they would speculate about the unknown, each going in a different direction, each plunging outside the possibilities of experimental procedures.

What questions do scientists ask? Without knowing what electricity is, scientists can determine what electricity does. They measure and control the function of electricity, making available vast sources of energy. Through using electricity, the miracle of radio, the electric light, and power serve man. The scientist queries, what does electricity do? How can it be used? How can we measure and control relationships between electrical energies?

Taking our cue from science, we can consider mind by asking questions that cast our study within the reach of controlled experimentation. Science has provided modern man with a method, the method of verification, that points the way out of the morass of metaphysical meandering. Technological advance, science, and invention demonstrate the effectiveness of this method. Yet, it is possible to shut out the logic of science by pursuing a quest that directs investigation towards insoluble

mysteries. We can avail ourselves of scientific reasoning, in relation to mind, through the questions we ask. If we seek the function of mind, we take the first step in understanding the use and workings of reflective thought.

DEWEY'S ANALYSIS

John Dewey, in his book *How We Think* empirically described reflective thought. Without delving into the mysteries of what mind is, Dewey has observed and reported how people think. His study relates a down-to-earth analysis of what people do when they think. Like the scientist who asks how does electricity work, Dewey asks, how do we think?

The following is a conclusion of his hypothesis. Thought functions to clear doubt and resolve conflict. Situations where confusion prevails precede thought. All people face many such situations daily. Whenever an individual's course of action is blocked and he does not know what to do, confusion and doubt arise. A lost key may keep an occupant from a house. A surgical operation may be needed that requires careful study by a group of doctors. Disputes between workers and managers may hold up production. A young man may worry about which girl to marry. A mother may wonder how to discipline her child. All these situations call for reflective thought. How are they clarified?

Reflection begins by directly facing the situation that causes difficulty. This necessitates an observation of conditions and circumstances surrounding the problem. Observation may result immediately from the senses or draw on past observations brought forward through memory. The conditions underlying the difficulty constitute the facts of the case. They are the things that are there, that have to be reckoned with. Discovering and dealing with facts requires discipline. The easy course of action overlooks facts.

From a consideration of facts possible courses of action arise. These various plans of solution undergo a judging process, a comparison of one with the other in the light of facts. Through holding the consequences of judgment in suspense, a new consideration of the facts takes place. This leads to further observations, more facts which in turn yield additional possible solutions. This continuous interaction of facts disclosed by observation and of the suggested proposals of solutions and the suggested methods of dealing with conditions goes on till some suggested solution meets all the conditions of the case and does not run counter to any discoverable feature of it.

Facts (data) and the suggested solutions (ideas) are the two indispensable factors of reflective thought. Observation and inference contribute data and ideas. Observation reveals the actual conditions of the situation while inference runs beyond the facts. Inference relates to the possible rather than the actual, hence proceeds through imagination to predict plans for future action. These two operations take reflective thought from the actual to the possible. Inferred plans need testing. Ideas are tested in experience either through overt action or by way of imagination. The consequence of this action confirms, modifies, or refutes the idea.

Whenever people expel doubt and confusion through an analysis of facts, we have an illustration of reflective thought. This way of behaving does not belong to some special place in

the anatomy or reside in a restricted set of activities within the head. A mechanic repairing a motor illustrates how reflection works. An automobile has been brought to a garage. The mechanic tries the starter with no response. His initial reaction is one of perplexity. He draws on previous experience for data, facts. From these data he surmises possible reasons why the car will not start (ideas, inferences). He observes the ignition system checking inferences against further facts. After weighing more inferences against further facts drawn from observation, he decides (judges) that a clogged gas line keeps the car from starting. He then tests this idea by repairing the line and trying the starter.

IMPLICATIONS FOR EDUCATION

What are the implications of such an empirical description of thought for educators? Thinking is not confined to the act of bringing students into contact with ideas regardless of how eminent the source. Mental prowess does not develop through the cultivation of some mysterious entity called "mind". Reflective thought does not belong to a special set of subject matter, but qualifies behavior whenever observations and judgment serve to alleviate confusion. Thinking is a way of responding to doubt. Orderly habits of thought do not come through a direct appeal to "thinking power". Thought arises indirectly when purposes and problems present a need to think. These habits develop in professions and occupations where classifications of information, observations, judgment, and testing of conclusions further the work at hand. In adult life the effective performance of a job calls for varying degrees of organized habits of thought. The work of everyday life demands a continued process of testing inferences and speculations in experiences. Issues and conflicts of the contemporary scene stand as a constant stimulus and check for effective thought. Ordered procedures effect desired ends. The province of mind and thought does not reside in some special place or belong to a chosen few, but permeates all of life where problems need solving.

How do teachers guide pupils in developing reflective habits of thinking? First, they must analyze their individual students. They must know how students think. Scientists face this problem in understanding how electricity works. They observe electricity under controlled conditions. Educators must do the same. Each educator must be a student of individual pupils. He must know their hopes, desires, interests, motives, attitudes, and aims. He gains this knowledge from a carefully conducted investigation of each individual in his class. He does not stand alone in his enterprise, however. The vast resources of biology, psychology, and sociology facilitate such a study. The teacher must know how school environment acts upon individuals to modify habits of thought, see the way individual powers express themselves in a social environment. Teachers face the important task of knowing how their pupils and colleagues further or impede the development of their pupil's reasoning powers. They may teach athletics, mathematics, science, industrial arts, or literature. If they wish to guide their pupils in developing the ability to think, they must know their pupils and how their propensities react to environmental factors. Individuals do their own thinking. No one can accomplish this job for them. The quality and intensity of thought depends on

environmental stimulation, however. A stimulating environment stems from pupil's needs, interests, and desires. When students continually face situations that constantly arouse new needs, and perplexities which call for observation, judgment, and testing of conclusions in experience, we have the necessary conditions for thought. Teachers can guide pupils in thinking by understanding their desires and motives and at the same time by knowing how environment operates to stimulate thought.

The thought process is the same for youths as for adults. Children face problems, select acts to meet specific ends, engage in operations that demand judgment. There is a difference between the cultivation of thinking of adults and children, however. Adults operate under external pressures. They have the problems of making a living, providing for a family, satisfying pressing economic and domestic demands. Their occupations force them into specialized and often restricted patterns of thought. Frequently, the intelligent character of their work is incidental or accidental. There are genuine educative values in their pursuit, but because of its indirect nature and limited scope, seldom do these values become explicit. The lack of these limitations on youth makes the problem of selecting activities that terminate in thoughtful behavior extremely complex. This offers educators their most challenging opportunity: the opportunity of providing an educative environment where the only restriction resides in the needs of the pupils. Here educators have the opportunity to provide occupations that prepare youth for adult life through developing habits of thought and reflection during their present pursuits. Stimulating experiences in youth that develop habits conducive to continuous inquiry overcome restrictions of thought in adult life. Training in youth, that develops "curiosity, suggestion, and habits of exploring and testing, which increases sensitiveness to questions and love of inquiry into the puzzling and unknown," provides the best assurance against arrested development of relection in adult life.

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