



Research Article

HABITS OF MIND

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ABSTRACT

All of your learning is useless to you until you have made it a habit of mind. Mental habits are like a team of stonemasons working on a medieval cathedral. Not much can be accomplished without their skilled hands. Habits of mind transform reflective thought into concrete action. Where do our mental habits come from? The various academic disciplines-history, language studies, science, and mathematics-furnish us with many of our most cherished habits. History teaches us how to place events in a larger social context of understanding. Language studies guide us in expressing ourselves by using clear and concise speech and written skills. Science cultivates the mental habits of curiosity and careful observation of nature. Mathematics alerts us to the patterns formed by numbers in the fabric of the cosmos. These four disciplines provide the core habits underlying the expansion of human knowledge and the promotion of cultural well being.

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INTRODUCTION

All of your learning is useless to you until you have made it a habit of mind. How can such a lofty objective be achieved? Whitehead (1929/1957) advises us: “Do not teach too many subjects.” And, “What you teach, teach thoroughly” (p. 2). Time and patience are required to construct a well informed mind-one where new knowledge is integrated into a coherent system for understanding the nature of things and for acting upon the world. Good habits of thought cannot be cultivated by merely memorizing scraps of disjointed information. Encyclopedic learning is only useful for taking standardized tests and for performing on TV game shows.

In 1890 William James published his monumental two volume work, *The Principles of Psychology*. Though most of what James had to say is now sorely out of date, his Chapter on Habit is still widely quoted by many books on psychology. Most human conduct, James (1890) argued, is regulated by habit, which “is thus the enormous fly-wheel of society, its most precious conservative agent” (p. 121). James included many of his thoughts on habit in his 1899 work, *Talks to Teachers on Psychology*. Teachers, James (1899/1958) argued, are the custodians of good habits. “The teacher’s prime concern should be to engrain into the pupil that assortment of habits that shall be useful to him throughout life” (p. 58). We need to make our nervous system our ally instead of our enemy. Students should make automatic and habitual as many useful habits as possible.

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The more the details of life that can be turned over to the effortless custody of habit, the more the higher powers of the intellect can be set free to reflect on abstract ideas.

Jerome S. Bruner gained prominence during the educational reform movement of the 1960s. He is best known as an advocate for discovery learning, where the student acquires knowledge by performing classroom activities similar to those of biologists, chemists, and historians. By engaging in the same methods of inquiry that are found in the various academic disciplines, students will come to acquire habits of mind similar to those of scholars conducting parallel forms of research. Bruner (1966) tells us the best introduction to any body of knowledge is by acquiring the discipline itself. “There is nothing more central to a discipline than its way of thinking” (p. 155). It is important for students “to learn the way of thinking-the forms of connection, the attitudes, hopes, jokes, and frustrations that go with it” (p. 155). The style of thinking of a given discipline is no less important than the knowledge derived from its research.

What are the habits of mind and the corresponding academic disciplines we would have students learn? A comprehensive list would take us far beyond the scope of the present inquiry. It will suffice our purposes to merely examine four major disciplines-history, the habit of looking at events in relationship to their context; language studies, the habit of clear and concise thinking; science, the habit of balancing inquisitiveness with patient observation of nature; and mathematics, the habit of finding numerical patterns in experience.

History. Why do we study history? George Santayana (1996) offers us a very pointed answer: “Those who cannot remember

the past are condemned to repeat it.” The study of history furnishes us with a context within which to place the events shaping our lives. Consider, for example, the three following episodes in recent American history—the Pentagon Papers, Watergate, and Collusion with Russia.

Daniel Ellsberg blew a promising career with the government in order to make public the Pentagon Papers, which revealed the story of America’s misadventure in Viet Nam. How America became involved in Viet Nam was a tragic mistake from the very beginning. The United States stumbled into a military mess left by the French. Presidents Eisenhower, Kennedy, and Johnson thought that surely the United States, given its military prowess, could succeed where the French had failed. The metaphor of a set of falling dominos captured the thinking about Viet Nam. America had to draw a line against Communism. The place selected was Viet Nam. Finally, after billions of dollars spent and thousands of lives lost, military planners came to the painful conclusion that the war was unwinnable. Tragically, neither President Johnson nor President Nixon could bring themselves to share this conclusion with the American people (Pentagon Papers: Definition & Summary, 2018, pp. 1-2).

The second historical episode revolves around Watergate. Bob Woodward and Carl Bernstein, who were reporters for the Washington Post, provided a running account of historical events. The drama unfolds around President Nixon’s attempts to cover up the burglary of the Democratic Party Headquarters at the Watergate office building. The story illustrates the old saying: “Oh, what a tangled web we weave when first we practice to deceive.” The cover up proved to be far worse than the crime. Nixon, seeing the handwriting on the wall, was forced to resign from office. Woodward and Bernstein later placed the whole episode in a book, *All the President’s Men* (The Watergate Scandal: Summary and Significance, 2018, pp. 1-17). The events surrounding Watergate are currently proving useful for looking at the constitutional crisis involving President Trump.

The United States is presently faced with an impending question: Did Donald J. Trump collude with the Russians in order to defeat Hillary Clinton in the 2016 presidential election? Luke Harding’s book, *Collusion*, provides a historical context within which to understand the present constitutional conundrum. President Trump has been emphatic in denying any relationship between himself and the Russians. Harding’s book offers evidence contradicting Trump’s claim. Trump has had business dealings with the Russians for the past 30 years. In 2008, when Trump was once more on the verge of bankruptcy, Deutsche Bank came through with a multimillion dollar loan that saved Trump’s financial empire. Harding (2017) quotes Donald Trump, JR., speaking in Moscow in 2008 about the Trump Organization, as saying: “Russians make up a pretty disproportionate cross section of a lot of our assets. We see a lot of money pouring in from Russia” (p. 276). Why do all of President Trump’s inner circle—Flynn, Manafort, Gates, Page, Ross, Cohen, and Sater—have financial ties to Russia? Hopefully, Mueller’s investigation will provide answers to these critical questions.

Language studies. Language is the *sine qua non* of human thought. Try thinking without it! Language is shaped by habits of thought and in turn habits of thought are shaped by language. Benjamin L. Whorf and Edward Sapir formulated a

theory of linguistic relativity, which asserts that the picture we have of reality is relative to the language we speak. English, for example, is constructed around nouns. The world for an English speaker is one of things. Time can be divided nicely into past, present, and future. English permits the speaker to say: “Time marches on.” The Hopi language, on the other hand, is constructed around verbs. Time is not a thing but an activity. Time cannot be neatly divided into past, present, and future. Hopi does not permit the speaker to say: “Do not waste your time.” The pattern of thinking in one language cannot be directly transferred into another. Hopi, for instance, does not recognize gender differences. The Spanish speaker would be tongue-tied without gender distinctions (Hoebel, 1958, pp. 567-571).

English is a handsome language. It is rich in strong nouns and colorful metaphors. Which is the stronger way of expressing the following idea? “Bob was totally lacking in courage.” Or, “Bob was a gutless wonder.” No one can completely master every aspect of any language. The grandeur of the language itself outstrips all our best efforts to conquer it. The most we can hope to achieve is to develop a feel for the poetry and power of its expressions. Shakespeare is rightfully celebrated as a master of English poetry and prose. He gave Hamlet a truly great line, “What a piece of work is man.” Are there any words that could be replaced to improve the meaning of Shakespeare’s sentence? Thomas Paine helped to torch the American Revolution with his pamphlet, *Common Sense*. Paine declared, “These are the times that try men’s souls.” Would it improve Paine’s sentence if we changed it to read: “Soul-wise, these are trying times”? When the Japanese bombed Pearl Harbor, President Roosevelt convened both Houses of Congress and delivered a stirring address, saying: “Yesterday, December 7, 1941—a date which will live in infamy.” Can you think of a stronger word?

Aristotle informed us, “Man is a rational animal.” At least humans have the capacity for reason, though they don’t always use it. Human actions are frequently swept away by emotions. After people have tried every other possible solution, they usually return to reason. The primary objective of a sound education is the cultivation of good habits of thought. The rational thinker places a premium on the pursuit of truth, which is often a very elusive thing. We live in an age of technology and computers. I-phones are the common experience of millions of people around the world. Hardly a day goes by that we are not inundated with new information. Which sources are credible and which ones are not? In order to make rational sense out of the flow of information, it is necessary to acquire good habits of thought. The thinker needs to know how to select appropriate sources, collect relevant facts, weigh supporting evidence, examine possible alternatives, and state clear and cogent conclusions.

Science. Science has played a powerful role in helping to reshape the modern mind. Our daily activities—eating, sleeping, speaking, and thinking—are touched by science. Francis Bacon was correct when he called science the *Novum Organum*, the way of knowing, for the modern mind. Many of our most cherished habits of thought have been forged by science. One of the oldest scientific principles runs back to the 14th century. William of Occam tells us, “we ought not to admit into the explanation of any phenomenon any more unproven assumptions than are strictly necessary” (Speyer, 1994, p. 4). Einstein’s theory of relativity, for instance, is “scientifically

simpler than Newton's (although the mathematics is more complicated) because Einstein dispenses with Newton's assumptions of absolute motion and absolute time" (Speyer, 1994, p. 4).

Science builds upon the natural human tendency of curiosity. We simply want to know about the world in which we find ourselves. "I have no particular talent," Einstein once remarked. "I am merely extremely inquisitive" (Guillen, 1995, p. 217). Besides capitalizing on curiosity, the scientific habit of mind, "engages in careful observation, uses logical reasoning, is skeptical, and acknowledges nature as the ultimate arbiter of the models it creates" (Scientific Habits of Mind, 2018, January 15). Additionally, science is highly skeptical, subjecting new ideas to empirical testing whenever possible. Truth can never be taken at face value. "Only through quantitative, logical, skeptical inquiry-by exercising scientific habits of mind-will we address our challenges and emerge as a successful species at the dawn of the next millennium" (Scientific Habits of Mind, 2018, January 15).

Science cultivates the habits of patient and persistent inquiry. Both Newton and Einstein, for example, knew how to worry a problem. Each would retreat into a room by himself-giving little heed to either food or rest-and concentrate his whole being on the solution to an abstract problem. Newton worked out the mathematics of the calculus. His accomplishment, says Guillen (1995), made possible the "powerful marriage of mathematics and experimentation that transformed natural philosophy into natural science" (p. 55). Similarly, though Einstein's special theory of relativity solved one problem, it opened up a larger question: How to resolve the paradox between the speed of light and Newton's universal theory of gravity? The answer did not come easily. "After a decade of intense, sometimes tormented study," says Greene (1999), "Einstein resolved the dilemma with his general theory of relativity," showing that space and time warp and distort the force of gravity (p. 53).

Mathematics. The universe is infused with quantity. Brooch any subject, soup or nuts, and the next thing you want to know about it is how many? Mathematics is the discipline dedicated to untangling and aggregating the various quantitative aspects of the cosmos. Mathematics, unlike verbal language, is not a spontaneous activity of the mind. It requires a goodly amount of schooling. Appropriate mathematical training, according to Whitehead (1929/1957), "should constitute training in logical method together with an acquisition of the precise ideas which lie at the base of the scientific and philosophical investigation of the universe" (p. 89). The discipline of mathematics teaches habits of mind related to abstract thinking. Education, if it is to be alive and effective, must communicate habits of thinking that enable learners to appreciate the "relations of number, the relations of quantity, and the relations of space" (p. 80).

To think mathematically is to recognize the symmetrical nature of the universe. Not everything is flux and change. There are certain permanent features, symmetries, found in nature. "Symmetry," Greene (2005) informs us, "lies at the core of an evolving cosmos. Time itself is intimately entwined with symmetry" (p. 220). Symmetry plays a defining role in statistics. The normal or bell shaped curve follows a symmetrical design, where the "centerline passes through the value that is the mean, median, and the mode of the distribution" (Harshbarger & Reynolds, 1981, p. 328).

Symmetry is found everywhere in the realm of aesthetics. It is a central player in why we find women to be beautiful, men to be handsome, and Westminster dogs to be winners. One of the clearest examples of symmetry is the design found in a spiral staircase at Loretto Chapel in Santa Fe, New Mexico. The staircase is an impressive work of art as well as skilled carpentry. "It ascends twenty feet, making two complete revolutions up to the choir loft without the use of nails or apparent center support" (Loretto Chapel, 2018, p. 2). The Sisters of Loretto, who used the Chapel, regarded the staircases' construction as a miracle sent by St. Joseph.

"Mathematics is the science of patterns and relationships" (The Nature of Mathematics, 2018, p. 1). One of the clearest examples of mathematical patterns and their expressions in nature is to be found in the Fibonacci sequence of numbers, which appears to be one of the principal laws of nature. Fibonacci sequence begins by adding the last two digits together to form a third number, example: 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, etc. The sequence has captured the imagination of mathematicians, artists, designers, and scientists for centuries. These numbers are found in the petals of flowers, seed pods on pinecones, and the scales of a pineapple. They are also expressed in the spiral constructed by the Nautilus. The Fibonacci numbers seem to be reflected in the growth of every living thing, including single cells, grains of wheat, and bee hives (Parveen, 2018, p. 19). The Fibonacci sequence of numbers is closely related to the "Golden Rectangle," which is commonly regarded as having more aesthetic appeal than any other rectangle.

CONCLUSION

Habits of mind are the tools for transforming knowledge into power. Habits bridge the gap between the brain and the hand, between theory and practice, between dreams and reality. Habits are the workhorses of the world. Little can be accomplished without them. Habits of mind such as-viewing events within a historical context, seeking clarity and simplicity in expression, checking curiosity against experience, and discovering symmetry in nature-are not merely desirable behaviors. They are also important values. Constructive habits of mind are at one and the same time the values found in an educated person. The head and the heart work better when they are in harmony with one another.

Finally, there is one more habit of mind or value that characterizes an educated person, humility. Knowledge should always be worn lightly. How many times have you wished you could go back and teach an earlier lesson, telling students what you now believe to be the case? Even the greatest authority may be proven wrong. Aristotle's geocentric cosmos held sway for nearly 2,000 years before it was overturned by Copernicus' heliocentric theory. When the researcher had just finished the defense of his dissertation, his major professor, who was a scholar from the old school, turned to him and whispered: "Now, you see, just because a man has a Ph.D. doesn't mean he knows everything."

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