

The W.I.S.E. Approach to Thinking¹

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IN THIS CHAPTER

- ▶ Introducing the W.I.S.E. approach *The acronym stands for Wonder, Investigate, Speculate, Evaluate.*
- ▶ Examples of problem solving *These cases show how W.I.S.E. is used with problems.*
- ▶ Examples of issue resolution *These cases show how W.I.S.E. is used with issues.*
- ▶ An important relationship *Often issues are identified while solving problems, and problems while resolving issues.*
- ▶ A caution about bias *Be alert for three forms of bias in your thinking.*

Scholars and practitioners of critical thinking agree that knowing the principles, habits, and skills of thinking is just the first step in becoming a critical thinker. The next step is to put this knowledge into practice. For that, you will need a strategy or approach to guide your efforts. Numerous strategies have been developed in various fields of study. Examples include “The Scientific Method,” “A Sociological Heuristic,” “The Process of Invention,” and the “Creative Problem Solving Process.”² Three of these strategies have seven steps, one has eight.

Having to learn a different strategy for each subject area is impractical and can be confusing. Fortunately, it is not necessary to do so. All such strategies are remarkably similar in the thinking processes they specify and even in the arrangement of steps. The strategy you will learn in this chapter is

¹ The W.I.S.E. approach is Copyright © 2002, 2010 by Vincent Ryan Ruggiero. The term itself and the explication presented in this chapter are used with permission.

² For explanations of these approaches, see, respectively: *Wikipedia*, the Free Encyclopedia, http://en.wikipedia.org/wiki/Scientific_method; James M. Henslin, *Sociology: A Down-to-Earth Approach*, 7th ed. (New York: Pearson, 2005), 144; Joseph Rossman, *The Psychology of the Inventor* (Washington, DC: The Inventor's Publishing Co., 1931), 57; Alex Osborn, *Applied Imagination* (New York: Scribner's Sons, 1957), 115.

GOOD THINKING!

The Story of Frank and Lillian Gilbreth

This remarkable husband and wife team, both of whom were born in 1868, became pioneers in the science of time management. As a young apprentice, Frank studied master bricklayers and noted that they all used different motions. He also noted that each of their assistants had an individual way of placing the bricks and mortar; some did less bending, reaching, and lifting than others and were more efficient.

Gilbreth realized that having all the workers imitate the more efficient ones would result in a considerable cost saving. He wondered how he could achieve maximum efficiency and, after considering various changes, decided to fit each scaffold with a shelf for the bricks and mortar and a convenient stacking system. Ultimately his changes reduced the number of motions required to lay a brick from 18 to 4 1/2. Gilbreth then became a building contractor and, later, a management engineer.

Eventually, Frank met and married Lillian, who had studied literature but then obtained a Ph.D. in industrial psychology. Both lectured at Purdue University and worked as management consultants, helping a wide variety of workers, including surgeons, save time, improve performance, and reduce fatigue. Their basic approach was to film workers at their jobs and then conduct exacting motion studies to determine optimum motion patterns.

Frank Gilbreth died in 1924. After his death, Lillian continued to use their approach to help injured individuals become productive despite their handicaps and to improve household efficiency. She died in 1972.

This amazing couple made all their contributions while raising twelve children. Their best-selling book, *Cheaper by the Dozen*, was made into a classic movie that is still shown from time to time on TV. A more recent version of their story starred Steve Martin.

For more information on the Gilbreths, see <http://gilbrethnetwork.tripod.com/bio.html>.

Step 1: Wonder

Almost 2,500 years ago, Socrates noted that wonder is the beginning of wisdom. What inspires wonder? One inspiration is a desire to improve things. In the early days of the railroad, tracks were made with a flange (lip) so that the trains would not fall off. Millions of tons of steel were required to make

that flange. Years later, someone wondered whether there was a less expensive way of keeping cars on the tracks and eventually thought of putting flanges on the trains' *wheels* instead of the tracks. That approach has been standard ever since.³

An even greater spur to wonder is negative experience. For Levi Strauss the experience was *failure*. During the California Gold Rush in the mid-nineteenth century, Levi Strauss received a shipment of heavy cloth and attempted, unsuccessfully, to sell it as material for tents. He wondered how he might use all that cloth and eventually invented Levi jeans.

For Robert Kearns, the experience was *frustration*. Bothered that the slowest setting on his wipers was still too fast, requiring him to listen to the thump-thump even in light drizzle, he wondered how the annoyance might be overcome and in time invented the variable speed wiper.

For businessman Frank McNamara, the experience was *embarrassment*. One day in 1949, he was having lunch in an expensive restaurant with some friends. When he went to pay, he discovered that he had left his wallet at home and needed to call his wife and ask her to bring it to him. After wondering how to avoid such situations in the future, he invented the credit card.

One of the strongest motivations to wonder is *controversy*. Every dispute is a challenge to find the most informed and reasonable view. There are local controversies such as campus parking and grading policies, international controversies such as trade embargos, and national controversies, including health care legislation, illegal immigration, medical marijuana, the auto company bailout, Social Security privatization, vaccines for children, and the drinking age, to name but a few.

Stay alert for events or situations that you find frustrating or annoying, and listen to what people complain about in conversation. Then, instead of grumbling, wonder about how the situations can be improved. Also be alert for issues that people disagree about and recognize them as opportunities to gain new insights.

Step 2: Investigate

Investigation aims to satisfy the curiosity expressed in wondering. The focus of investigation is slightly different for problems than for issues because problems are seldom controversial,⁴ whereas issues are always controversial.

Problems In investigating a problem, the aim is to understand (1) how the process in question works or how the implementation is designed;

³ George Iles, *Inventors at Work* (New York: Doubleday & Page, 1906), 370.

⁴ Of course, specific proposals for *solving* problems can be controversial.

(2) why people are dissatisfied with the process or the implementation—for example, a process may be too time-consuming or an implementation may not work as intended; (3) and why previous attempts to solve the problem, if any, failed.

Issues In investigating an issue, there are two aims. The first is to acquire the evidence necessary for you to form a judgment (see Step 4). Following are the most common kinds of evidence, with a comment on the comparative reliability of each.

Anecdotes. Perhaps the most common form of evidence, anecdotes are brief or extended accounts of something that happened. If verified, they can be valuable, but tracing their origin and verifying them can be difficult. (Anecdotes often prove to be empty rumors or hoaxes.)

Eyewitness testimony. Eyewitness testimony is a report of what someone observed firsthand. Such testimony is popularly regarded as highly reliable. After all, there is something persuasive about a seemingly honest person who says “I saw it happen” and goes on to provide the details of who, how, and where. However, research has shown that eyewitness testimony is sometimes false. Preconceived notions can distort perception, and the memory of an earlier event can be corrupted by subsequent events. Therefore, eyewitness testimony varies in reliability.

Laboratory or field experiments. Laboratory experiments are performed under controlled circumstances; field experiments take place in natural surroundings. For example, one might observe a group of children at play, participants at a political convention, or Amish farmers raising a barn. For the results of the observation to be reliable, the observer must not have influenced the behavior of the group. Also, the period of observation must have been of reasonable duration. Both kinds of experiment are reliable if replicated—that is, duplicated by one or more independent sources.

Statistical studies. Statistics usually refers to quantitative information obtained about every individual in a group or category. Examples of statistics are the percentage of deaths caused by drunken driving, the comparative college admissions scores of various racial and ethnic groups, and the voting records of members of Congress. If the statistical sources are reputable, the statistics are generally highly reliable. But it is prudent to check that they are quoted accurately.

Surveys and opinion polls. This type of information is a subdivision of statistics. However, it is obtained in a special way—by a sampling of the group. The sample may be random or systematic (e.g., every 50th name

in the phone book). It may also be done in person, by telephone, by post, or by email. Such sampling is generally highly reliable if these conditions are met: All members of the group must have an equal chance of being contacted, and the questions must be clear, unambiguous, and unbiased. Keep in mind that the way survey questions are phrased can influence the responses. (Caution: Surveys measure only how many people hold a viewpoint, not whether the viewpoint is correct.)

Expert opinion. This kind of testimony has the advantage of being grounded in extensive knowledge of the subject and understanding of what is typical in most cases. This kind of evidence can be highly reliable, especially if the opinion is shared by most experts. (Remember, though, that experts are human and can be mistaken even when they agree.)

Research reviews. Research reviews examine the general body of research information on a topic. It is not uncommon for such a review to cover dozens, even hundreds, of independent research studies. When research reviews do not omit any significant studies, they are among the most highly reliable types of evidence.

The second aim of investigation is to identify the conflicting arguments about the issue. An argument is defined as a rationale or line of reasoning consisting of two or more assertions⁵ that are offered as true, plus a conclusion that purportedly follows logically from them. When members of Congress disagree over a piece of legislation, they offer conflicting arguments. So do prosecution and defense attorneys when they make their summations to the jury, and scholars when they engage in formal debate. Arguments can vary in length from a single sentence to a brief essay or even to a 400-page book. Complex arguments contain a network of assertions.

As you examine the arguments people present on an issue, you will encounter the evidence they believe supports their assertions. (The types of evidence will be the same as those listed previously.) Responsible individuals will offer significant, and often substantial, evidence. Irresponsible individuals will offer little or no evidence, sometimes because of carelessness, and sometimes because they mistakenly believe that their ideas deserve to be accepted on their own say-so.

The more thorough your investigation, the more prepared you will be for the next step, speculation. Remember that the purpose of investigation is to *understand* and not to judge. Judgment is a separate step and comes later. (Note: The next chapter explains how to conduct investigations. Feel free to look ahead to that chapter if you have any questions.)

⁵Logicians call such assertions *premises*.

GOOD THINKING!

The Story of Elizabeth Loftus

The majority of men and women engaged in scholarly research are not invited to the talk shows or written about in popular magazines, even when their work has a significant effect on people's lives. Psychologist Elizabeth Loftus is an exception. One reason is that her research has challenged some longstanding beliefs about human memory. Another is the relevance of that research to some prominent controversies of the last decade or two.

The traditional view is that memory is like a videotaped record of events etched into the grooves of our minds. According to this theory, a particular record may become hidden, even from ourselves, but it is never lost. Given our desire and, in some cases, the assistance of people experienced in recovering such "data," we can recover any memory, however traumatic. And what we recover will be accurate to the smallest detail.

A number of researchers have challenged this traditional view of memory, but none as effectively as Loftus. She devised her own research projects and proved that real memories can be altered, and that fictitious memories can be created. In experiments with children and adults, she first showed them short films and later discussed their recollections of what they saw. In one experiment, by merely asking "Did you see a bear?" or "Did you see a boat?" she was able to make them remember details that were not present in the film.

In another case, by using the word "smash" instead of "hit" she was able to change people's estimate of the speed of cars and to create a memory of broken glass where there had been none.

For more information on Elizabeth Loftus, see Elizabeth Loftus and Katherine Ketcham, *Witness for the Defense* (New York: St. Martin's Press, 1991) or Elizabeth Loftus, *Eyewitness Testimony* (Cambridge, MA: Harvard University Press, 1996).

Step 3: Speculate

The aim of this step is to consider, in light of your investigation, various responses to the problem or issue. Because of the difference between problems and issues, we will discuss each separately.

Problems With problems, speculation aims at identifying a broad range of possible solutions. Begin by asking a variety of "How can . . . ?" questions. (These questions are recommended because, unlike others, they

point to solutions.) Take, for example, the problem of communicating with people over distances. During America's westward expansion, the problem was expressed, "How can we expedite mail delivery to the West Coast?" That question led to development of the Pony Express. Another question, "How can we communicate messages without transporting them?" led to an even better solution—the invention of the telegraph. Slightly different "How can . . . ?" questions led to other communications innovations, including the typewriter, the telephone, the computer, and the Internet.

Consider, too, the problem hotels had with long checkout lines during peak morning hours. Managers asked, "How can we handle the long lines at the checkout desk more efficiently?" and thought of adding clerks and posting "Be sure to allow time for checkout" reminders in guests' rooms. But only when managers dared to ask the seemingly outrageous question "How can we eliminate the formal checkout procedure altogether?" did they think of placing the final bill under the door on the day of checkout and offering instant video display of guests' accounts on the TV screen.

When the massive oil spill occurred in the Gulf of Mexico in early 2010, the questions asked included "How can the break in the pipe be sealed?" "How can the spilled oil be captured?" "How can the oil be prevented from reaching the coastal areas?" "How can animals caught in the oil be saved?" and "How can people whose businesses have been harmed by the spill be compensated?"

Notice that each "How can . . . ?" question in the previous paragraphs opened a different avenue of thought and thus led to a different kind of solution. So, be sure to ask many different "How can . . . ?" questions. The key to doing so is to choose your verbs carefully. For example, if the problem concerns a process (such as registering for classes), you might ask "How can we *simplify* the process?" "How can we *speed up* the process?" and "How can we *shorten* delays in the process?" For other types of problems, you might choose verbs such as *combine*, *reduce*, *eliminate*, *repair*, *streamline*, or *enhance*.

After you have expressed the problem in a number of "How can . . . ?" questions, think of as many possible answers as you can for each question. The first answers you think of are likely to be common and predictable, but if you persevere, you will produce some uncommon and therefore more interesting possibilities. As people familiar with the technique of brainstorming will tell you, it is best to separate this idea *production* from idea *evaluation* (Step 4 of the W.I.S.E. process). The reason is that stopping to evaluate each idea breaks the flow of thought and necessitates beginning again. Also, be sure to devote sufficient time to idea production. The more possible solutions you consider, the better your chances of producing a satisfactory, or even a great, one. Skimping on idea production will lessen your chances of solving the problem.

Issues With issues, speculation aims at considering possible resolutions of the controversy. (These possibilities will be compared and narrowed down in the final stage, evaluation.) First, summarize the arguments on both sides of the issue, as revealed in your investigation. Keep in mind that there may be a number of different arguments for both the pro and the con side of an issue. In some cases you may be able to think of new arguments that you did not encounter in your investigation; summarize these too. Include in each summary the main assertions and the conclusion.

Next, turn all the conflicting assertions and conclusions into questions, using words like “Is?” “Does?” “Could?” “Should?” and “Would?” The advantage of this approach is that it forces you to analyze every assertion and not simply *assume* that the ones you are most familiar with are correct. (This assumption, common among careless thinkers, is a serious obstacle to critical thinking.)

The simplest way to perform these steps is by dividing a sheet of paper into three columns. Figure 2.1 illustrates this approach with three examples, each from a different issue.

Step 4: Evaluate

The aim of this step is to decide on the best solution to the problem or resolution of the issue.

Problems For problems, review all the possible solutions you produced in response to your “How can . . . ?” questions and decide which is the *best* solution. For example, for the problem of the Gulf oil spill, there were many possible solutions offered for *each* of the main questions—“How can the break in the pipe be sealed?” “How can the spilled oil be captured?” “How can the oil be prevented from reaching the coastal areas?” “How can animals caught in the oil be saved?” and “How can people whose businesses have been harmed by the spill be compensated?”

Next, test the possible solutions against the relevant criteria and decide which solution is best. Here is a comprehensive list of criteria helpful in finding solutions to problems. (Some may not apply to the particular problem you are addressing.) After considering the relevant criteria, decide which of your possible solutions best fits them.

Comprehensiveness. Will any of these solutions solve the entire problem? If not, which one will solve most of it?

Longevity. Which solution is likely to last the longest? In the case of products, the kind of materials and their design will be relevant.

Practicality. Which solution is the most workable? Simplest? Least confusing? In the case of a product, how simple or complex will its function be? In the case of a process, how many steps will be required to perform it?

Safety. Which solution is safest—in other words, which poses the least risk to those involved in its implementation?

Efficiency. Which solution requires the least time and effort to implement? For example, which involves the fewest steps and the fewest people to implement it?

Economy. Which solution costs the least? Both the initial cost and the continuing cost should be considered. Sometimes the initial cost—say, for training of staff—may be low, but the continuing cost—say for salaries and utilities—may be prohibitively high.

Compatibility. Which solution is most compatible with existing approaches and procedures?

Appearance. If the solution is something that will be seen—for example, a product—does it have aesthetic appeal?

Morale. Which solution will have the most positive (or least negative) effect on the people involved in implementing it?

Legality and morality. Which solution is most consistent with existing legal obligations and moral requirements—for example, to people and the environment.

Issues For issues, your goal is to find the most defensible point of view. To do this you must decide which assertions are true, and which conclusion flows logically from those assertions. The most defensible view may be exactly what someone has already expressed, or a different view that you construct from the insights on both sides of the issue.

Begin by addressing each of the questions you raised about the various arguments (as illustrated in Figure 2.1). In the case of an assertion, check the kind and quality of the evidence that was offered in support, or that you discovered.

For **anecdotes**, consider: Is the author's presentation of the anecdote or case faithful to the facts? If so, are the experiences described typical or untypical? How plausible are they? Are they verifiable?

For **eyewitness testimony**, consider: Does the person have anything to gain by misrepresenting the facts? Were the conditions favorable to observation—for example, did the event occur in the day or at night, in good weather or bad? Did the event occur slowly or quickly? Was the person in a state of mind conducive to accurate observation? Could the person's memory have been confused by something that occurred after the event but before the testimony was given?

For a **laboratory experiment**, consider: Have the findings of the experiment been confirmed by other, independent researchers?

For a **field experiment**, consider: Did the presence of the investigator influence the outcome?