CHAPTER 1

INTRODUCTION

1.1 THINKING SKILLS IN THE AGE OF GLOBALIZATION

Whether we like it or not, globalization is changing the way we work and live. First of all, we are increasingly faced with complex problems that affect the whole world, whether it is global warming, pollution, financial crises, or new epidemics. We need good thinking and creative ideas to coordinate efforts to solve these problems. At the personal level, globalization brings about an ever-quickening pace of life. We have a huge amount of information available, but what we learn today might easily become obsolete tomorrow. Although fast changes also bring new opportunities, we now have to compete with talented people across the world. To be successful in this environment, we need good thinking skills that can help us make reliable decisions and acquire new knowledge quickly.

But what do we mean by good thinking skills? Basically, it comes down to two things—critical thinking and creativity. Critical thinking is thinking clearly and rationally. It involves thinking precisely and systematically, and following the rules of logic and scientific reasoning, among other things. As for creativity, it is a matter of coming up with new and useful ideas, generating alternative possibilities. This book is about these two sets of thinking skills, but at this point, you might ask,
Which is more important, critical thinking or creativity? The short answer is that they are equally important. We need creativity to come up with ideas to solve problems, but we also need critical thinking to evaluate and improve these ideas. They complement each other, and we need both to survive and to prosper.

In this book we shall discuss critical thinking first, and come back to creativity near the end. As we shall see, there is a lot more we can say systematically about critical thinking. A critical thinker is someone who is able to do the following:

- Understand the logical connections between ideas.
- Formulate ideas succinctly and precisely.
- Identify, construct, and evaluate arguments.
- Evaluate the pros and cons of a decision.
- Evaluate the evidence for and against a hypothesis.
- Detect inconsistencies and common mistakes in reasoning.
- Analyze problems systematically.
- Identify the relevance and importance of ideas.
- Justify one's beliefs and values.
- Reflect and evaluate one's thinking skills.

As we can see from the list, critical thinking skills are essential for all sorts of careers in which we have to communicate ideas, make decisions, analyze, and solve problems. This is why critical thinking is called a \textit{domain-general} thinking skill. But critical thinking is not just for the workplace. To live a meaningful life and plan for the future, we need to think about ourselves honestly and carefully. The Greek philosopher Socrates (469–399 B.C.E.) once said, "the unexamined life is not worth living." One big difference between human beings and other animals is our capacity for self-reflection. We can examine the purpose and meaning of our life and change ourselves accordingly. Critical thinking contributes to this process of self-evaluation and transformation.

Good critical thinking is also the foundation of science and democracy. Science requires rationality in designing experiments and testing theories. A vibrant and progressive democracy requires citizens who can think objectively about social and political issues and are able to avoid biases and prejudices. So obviously the cultivation of critical thinking should be a central aim of education.

\section*{1.2 Some Misconceptions about Critical Thinking}

However, critical thinking is sometimes thought to be too confrontational. Some people think critical thinking means criticizing others all the time, which is not constructive. But this is a misunderstanding. Critical thinking is not a purely
destructive force. First, by rejecting bad ideas, we become better at finding the truth. Second, thinking critically does not mean we criticize people all the time. When other people are right, we don't have to disagree. And when other people are wrong, critical thinking helps us recognize the mistakes being made, but it does not follow we have to publicly denounce them. Sometimes mistakes do not matter. Sometimes we have to be polite, and sometimes we can help people reason better not by criticizing them but by other indirect means—for example, by giving hints and suggestions. A critical thinker can be sympathetic and constructive rather than confrontational.

Another objection to critical thinking is that it is not practically useful because people in real life do not listen to reason. They act on the basis of self-interest, emotion, or personal relationships. The first problem with this objection is that it confuses rational thinking with talking about reasons. It might be true that many people are irrational, and to influence them we need to appeal to authority, emotions, or anything other than reason. But we can still use critical thinking to think strategically about the best means to achieve our objectives.

The objection is also wrong in assuming that critical thinking is opposed to emotions, relationships, and so on. Consider for example love and friendship. They are certainly valuable, but critical thinking can help us cultivate them. For example, thinking carefully about what is good or bad about a relationship can help us improve it and make it more fulfilling. Besides, it is not always wise to act solely on the basis of emotions. They can be biased by ego, fear, and greed. Thinking more about our decisions can counteract this problem.

1.3 IMPROVING OUR THINKING

So how do we enhance our critical thinking if it is so useful? Obviously, we are all able to think critically to some extent, or we will not survive very long! But there is always room for improvement. Even with a skill as natural as running, training with an expert can improve our breathing and posture and help us run even better. Thinking is something we all do and take for granted, but the fact is that even normally intelligent people can sometimes be stubborn and biased. Psychology research tells us that people make lot of mistakes in their reasoning—they overestimate their abilities, interpret the world to confirm their prejudices, and look for causes and patterns in the wrong places. By studying critical thinking, we are more likely to avoid such errors. We can also help other people by studying critical thinking. Sometimes we get the feeling that an argument is wrong but we do not know exactly why. Critical thinking gives us the concepts and vocabulary to explain what is wrong. This promotes understanding and more effective discussions.

Good critical thinking is a cognitive skill. In general, developing a skill requires three conditions—learning the theory, deliberate practice, and adopting the right attitudes. By theory we mean the rules and facts we have to know in order to possess the skill. For example, one cannot be a good basketball player without
knowing the rules of the game—for example, kicking the basketball is not allowed. Likewise, thinking critically requires knowing a certain amount of logic. However, knowing the theory is not the same as being able to apply it. You might know in theory that you should balance the bike when you are cycling, but it does not mean you can actually do it. This is where practice comes in, because it translates your theoretical knowledge into actual ability. However, your attitudes make a big difference as to whether your practice is effective and sustainable. If you hate playing the piano, forcing you to practice is not productive in the long run.

1.3.1 Theory

Let us now look at the theoretical knowledge required for good critical thinking. It can be divided into five main areas, and in this book we shall discuss all of them:

1. **Meaning analysis**: Explain ideas clearly and systematically; use definitions and other tools to clarify meaning and make ideas more precise.

2. **Logic**: Analyze and evaluate arguments; identify logical consequences and inconsistencies.

3. **Scientific methods**: Use empirical data to test a theory; identify causes and effects; probability theory and statistics.

4. **Decision and values**: Rational decision making; critical reflection of value frameworks and moral judgments.

5. **Fallacies and biases**: Typical mistakes of reasoning and the psychological traits likely to cause such mistakes.

Naturally you will find some topics more interesting than others. But whether we are learning martial arts or the piano, there are basic techniques we have to master. They might be boring, but they form the foundation of more advanced techniques. The same is true of critical thinking. Some theories and principles seem rather dry and abstract, but I hope you will appreciate their power and relevance to everyday thinking once you understand how they can be applied.

1.3.2 Practice

Psychologists have discovered a 10-year rule when it comes to acquiring a skill. It takes about 10 years of intensive and structured practice—around 10,000 hours of practice—to reach world-class level in a certain area, even for a talented individual. This rule is supposed to apply to all kinds of expertise, whether it is sports, music, chess, writing, or scientific research. Even a genius prodigy such as Mozart spent years practicing musical instruments and writing lesser pieces, under great pressure from his father, who was himself an outstanding musician. Many of Mozart's childhood compositions were arrangements of works by other composers, or they were thought to be partly written by his father. His piano con-
certo No. 9 (K.271) is perhaps the earliest original work that is highly regarded by critics. But by then Mozart had already been composing for over 10 years.

Years of early training and dedicated parents are two typical themes in achieving world-class performance. Tiger Woods has been one of the most successful golf players of all time. His father, Earl, gave him a sawed off a golf club to play with when he was 9 months old. When Tiger was 18 months old, Earl started taking his son to the golf course, and a coach was hired when Tiger was 4 years old. Earl continued to train his son, and just over 10 years later in 1991, Tiger became the youngest ever U.S. Junior Amateur Champion.

Of course, it is probably unrealistic to expect all of us to put in the same amount of effort solely into improving our thinking. But what empirical research tells us is that good thinking does not come for free. If we are serious about improving our minds, we have to come up with a plan and be ready to spend a lot of time training. Just reading this book is not going to be enough. You also need to do the exercises and apply your knowledge to your daily life. Critical thinking should become a natural habit, a way of life, rather than something you do occasionally.

How do we turn critical thinking into a natural habit? Here is a simple and practical method for you to try out. We call it the fourfold path to good thinking. To follow the method, we make it a habit to ask these four basic questions about the ideas we come across:

<table>
<thead>
<tr>
<th>Question</th>
<th>Issues to think about</th>
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<tbody>
<tr>
<td>What does it mean?</td>
<td>Are the keywords and the main concepts clear?</td>
</tr>
<tr>
<td></td>
<td>Can the ideas be made more precise?</td>
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<tr>
<td></td>
<td>How is it related to other things?</td>
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<tr>
<td></td>
<td>Any examples to illustrate what is meant?</td>
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<tr>
<td>How many supporting reasons and objections?</td>
<td>List the reasons for and against the claim.</td>
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<tr>
<td></td>
<td>Count and evaluate these reasons.</td>
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<tr>
<td></td>
<td>Think about both sides of an issue.</td>
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<tr>
<td></td>
<td>Any counterexamples to the claim?</td>
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<tr>
<td>Why is this important or relevant?</td>
<td>What are the major consequences?</td>
</tr>
<tr>
<td></td>
<td>How does it affect people? Is it useful?</td>
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<tr>
<td></td>
<td>Is it surprising?</td>
</tr>
<tr>
<td></td>
<td>Have I learned something new and interesting?</td>
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<tr>
<td>Which are the other possibilities to consider?</td>
<td>What other information might be relevant?</td>
</tr>
<tr>
<td></td>
<td>Any similar cases to think about?</td>
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These questions look simple, but they are actually quite powerful because they introduce a good structure to organize our analysis. As an example, suppose we are discussing whether it is wrong to eat (nonhuman) animals. Here is how we might apply the fourfold path:
1. The first question—what does it mean?—is about clarifying the key concepts so that we can understand more clearly the claim under discussion.

- What do we mean by animals? Dogs and chickens are obviously animals. But what about fish, oysters, insects, bacteria? Is it also wrong to eat them? Where do we draw the line?
- If eating animals is wrong, how wrong is it? As bad as killing people?

2. To carry out the second step of the fourfold path, we list all the reasons for and against the claim under consideration.

- Arguments against eating meat might include: animals have rights, animal farming create a lot of suffering, and it is more efficient to use land to grow vegetables than to raise animals.
- Arguments on the opposite side might include: farm animals exist because of us and so we can do what want with them, and humans are more intelligent than animals.
- It is always a good idea to be able to count the number of arguments. For example, three arguments in support and two against.
- Think about both sides of an issue. Even if you think eating meat is fine, you should try your best to come up with opposing arguments. You will gain a deeper understanding of your own position and be able to defend it better.
- Evaluate the arguments on both sides. What seems to be a good argument might turn out not to be the case on further reflection—for example, why can we eat animals just because we are smarter? Does it also mean adults can eat babies and intelligent aliens can eat human beings?

3. The third step of the fourfold path is to consider whether the issue is important. Does it really matter what the correct answer is? What are the theoretical, social, personal, or political implications?

- How would the world be different if more people give up meat?
- How important is this question compared with other issues such as poverty and starvation?

4. The last step is to explore alternative possibilities and further issues.

- Does the level of intelligence of the animal make a difference?
- How about eating animals raised in a happy environment and killed in a painless manner? Is this also wrong?
- What about eating animals that die naturally? What if we can grow meat from stem cells and eat meat without killing animals?
As you can see, although the fourfold path consists of four very simple questions, they help us examine an issue in depth from different perspectives. To improve your thinking, use this method often in your daily life, when you read magazines, surf the web, watch TV, or chat with others. You will become a more sophisticated, systematic, and creative thinker.

Critical thinking and investment

The idea that we should think critically might seem downright boring, and yet we should not underestimate the power of critical thinking. It requires having the discipline to reflect on the reasons for our actions, and this is very important if we want to improve ourselves and become more successful. Warren Buffet is one of the world’s richest persons, widely admired for his investment record and philanthropy. The adherence to critical thinking is a crucial factor in Buffet’s success. Here is what he says about the importance of being able to give reasons for our actions:

You ought to be able to explain why you’re taking the job you’re taking, why you’re making the investment you’re making, or whatever it may be. And if it can’t stand applying pencil to paper, you’d better think it through some more. And if you can’t write an intelligent answer to those questions, don’t do it.

I never buy anything unless I can fill out on a piece of paper my reasons. I may be wrong, but I would know the answer to that. “I’m paying $32 billion today for the Coca-Cola Company because...” If you can’t answer that question, you shouldn’t buy it. If you can answer that question, and you do it a few times, you’ll make a lot of money.

Making money might not be our top priority, but if we can apply the same discipline in giving reasons for our actions and think about these reasons carefully, we are more likely to achieve our goals.

1.3.3 Attitude

If you enjoy an activity and believe it is important, you will probably put in more effort and pay more attention to your performance. Similarly, there are positive attitudes that are more conducive to good thinking:

• **Independence of thought**: Good thinking is hard. Some people just want to know the answers rather than work it out themselves. Others have no patience for abstract or complicated ideas. A good thinker is able to think independently and go against conventional wisdom if need be.
• **Open-mindedness**: A good thinker looks at the evidence objectively, and is willing to suspend judgment or change her opinion depending on the evidence. This is not a sign of weakness. An open-minded thinker is not dogmatic. She is willing to admit mistakes, think about new possibilities, and will not reject new ideas without good reasons.

• **Cool-headedness and impartiality**: Good thinking does not require giving up emotions. But we should avoid letting our feelings overwhelm our reasoning. For example, it is difficult to think straight if you get angry easily when other people disagree with you. Fair and objective evaluations help us make better decisions.

• **An analytical and reflective attitude**: Do not jump to conclusions. A good thinker is one who spends time to analyze an issue systematically and carefully and to actively search for arguments and evidence on both sides. She is interested in learning more about her own strengths and weaknesses to improve her performance.

These attitudes are crucial for good thinking, but they are more a way of life than a piece of theoretical knowledge. They have to be internalized to become part of our natural habit and personality. This is easier said than done! Good thinking takes a lot of time and effort. But look at it this way: If we are willing to change ourselves when most people don't, this gives us the opportunity to excel and become better than average.

**EXERCISES**

**Note**: Suggested answers are at the end of the book, except questions that are marked with 📘.

1.1 This is a passage from the management best-seller *In Search of Excellence* (Peters and Waterman, 1982, p. 106). Can you summarize the argument against intelligence and logical thinking? Is it a good argument or not? Explain your reasons.

If you place in a bottle half a dozen bees and the same number of flies, and lay the bottle horizontally, with its base (the closed end) to the window, you will find that the bees will persist, till they die of exhaustion or hunger, in their endeavor to discover an opening through the glass; while the flies, in less than two minutes, will all have sailed forth through the neck on the opposite side. ... It is the bees' love of flight, it is their very intelligence, that is their undoing in this experiment. They evidently imagine that the issue from every prison must be where the light shines clearest; and they act in accordance, and persist in too-logical action. To bees glass is a supernatural mystery. ... And, the greater their intelligence, the more inadmissible, more incomprehensible, will the strange obstacle appear. Whereas
the featherbrained flies, careless of logic ... flutter wildly hither and thither, and meeting here the good fortune that often waits on the simple ... necessarily end up by discovering the friendly opening that restores their liberty to them.

1.2 Do you agree with these remarks? Explain your answers.
   a) Critical thinking is too negative because we are always trying to find fault but this is not a very healthy attitude.
   b) Critical thinking is not very useful because personal connections and relationships are more important for success.
   c) We often have to make decisions very quickly without a lot of time to think. So critical thinking is not really that useful.

1.3 Here is another definition of critical thinking from Scriven and Paul (1987). How would you compare this definition with the one in this book?

   Critical thinking is the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action. In its exemplary form, it is based on universal intellectual values that transcend subject matter divisions: clarity, accuracy, precision, consistency, relevance, sound evidence, good reasons, depth, breadth, and fairness.

1.4 ☐ Apply the fourfold path to the following claims and list the issues and questions you should consider.
   a) It is always better to have more choices.
   b) Buying stocks is a good investment because the stock market always goes up in the long run.
   c) It is not wrong for a person to commit suicide rather than to suffer through a painful terminal illness.

1.5 Here are some questions for you to reflect on your thinking attitudes. Which of them are true of you?
   a) I can improve my thinking skills further.
   b) The purpose of thinking is not to be right all the time.
   c) I am not afraid to try out new ideas.
   d) Thinking takes time and might not be easy.
   e) I do not enjoy thinking about complicated ideas.
   f) Thinking is boring and it is better to spend time doing other things.
   g) Thinking is easy. I just use my gut feelings to make up my mind.
   h) The point of giving reasons is to show people that they are wrong.