Tutorial G01: How to Classify Problems

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Solving problems require good critical and creative thinking. We need to be able to define the problem, analyse the nature of the problem, and come up with effective solutions. The ability to solve problems is a very important skill in the workplace.

G01.1 Defining the problem

When we are faced with a difficult problem, how should we go about solving it in an efficient and effective manner? An important starting point is knowing what the problem is. In school students are usually solving problems that are already well-formulated. Most problem sets and exam questions are like that. However, in everyday life and in the workplace, most of the time we have to identify the problem and formulate it correctly. In defining a problem there are these points to consider:

The formulation of a problem can indirectly influence us in the directions that we take in seeking solutions. So sometimes it might be useful to come up with alternative formulations of the problem, and consider how to best formulate a problem. For example, faced with an unhappy relationship on the verge of breakup, one might think of the problem as "why is she leaving me?", and focus on the faults and reasons of the other person. But thinking of the problem in terms of "what have I been doing wrong" might lead one to focus more on oneself and think about what one might do to rescue the relationship. Similarly, instead of focusing on how a business competitor is taking away business from one's own company, the real problem to focus on might be why one's own company is not doing enough to adapt to the new market.

If the problem concerns how a goal or target might be achieved, it is important to avoid vagueness and try to be more specific. If we are thinking about how to improve a company's profit, it would be useful to say more precisely how much of an increase we are looking for, in order to know whether the goal is realistic or not.

It is also important to think about whether the problem so-defined is real or not. What data is available to show that there is a real problem to be solved? For example a university might be concerned that student standards are dropping. It would be useful to have information available confirming that this is not a subjective judgment but an actual declining trend. Gathering more data about the problem can also help us understand how serious it is and which are the most important factors to consider in dealing with it.

G01.2 Problem classification

Having defined the problem, the next thing to do is to know what type of problem it is. Generally, a problem might be posed in the form of a question, and we might classify these questions into three kinds:

Empirical questions
Conceptual questions

Empirical questions

Empirical questions are questions concerning empirical facts, particular events or causal processes in the world. Here are some examples:

Who is the current president of the United States?
Did Germany participate in the First World War?
Can AIDS be transmitted through kissing?
Is the universe expanding?

To answer an empirical question, we need observations or experiments, or solicit the help of experts in the relevant field, such as physics, biology, psychology, economics, history, etc. Very often these questions cannot be answered by sitting in the armchair. For example, consider the question of whether human beings evolved from other forms of animals. This is an empirical question to be answered by careful scientific study. We might have certain convictions or intuitions about the answer, and be inclined to believe one way or another. But these prior beliefs should be evaluated according to empirical data. Pure thinking is not going to help find the answer.

On the other hand, pure thinking can help us answer conceptual questions. Here are some examples of conceptual questions:

Is rule of law sufficient for democracy?
Can a woman sexually harass a man?
Are there any married bachelors?
Is 981567 divisible by 3?

To answer these questions, we appeal to logic and the meaning of words and concepts to arrive at the answers without engaging in experiments or observations. In other words, mere thinking is enough to answer these questions. Here, "mere thinking" refers to conceptual analysis and reasoning. For example, in answering the first question, we note that "rule of law" means the consistent use of due procedure and legal processes in a society where the legal principles are not arbitrarily applied or withheld. But we might note that the laws in a society where this is the case might nonetheless discriminate against certain social groups and provide them with inadequate political representation in the government. As long as these rules are not abused and are consistently applied, there is rule of law but no democracy. Using pure reasoning and our understanding of the concepts of "rule of law" and "democracy", we conclude that rule of law is not sufficient for democracy.

Similarly, the other conceptual questions are questions which can be answered without empirical observations or scientific study.

Finally, let us consider evaluative questions. Evaluative questions are questions which explicitly or implicitly invoke values and norms. These questions relate to value judgments about moral correctness or aesthetic values. Here are some examples:

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Is abortion immoral?
Is Beethoven a more profound composer than Mozart?
Should the amount of unemployment benefits be raised?

To answer this type of questions, we need to understand the distinction between intrinsic and instrumental values. Very briefly, intrinsic value is value that exists on its own. The intrinsic value of an object does not depend on its being used to satisfy some further end. But if something has value only because and in so far as it can be used to satisfy a further end, and would cease to have value if it fails to do so, then the value involved is instrumental value. (See here for further discussion.)

So here is a summary:

G01.3 Mixed questions

Conceptual questions might be regarded as the most basic kind of question among the three categories. This is because factual and evaluative questions can only be answered if we understand the relevant concepts invoked by the questions. For example, if we do not know what a black hole is, we cannot answer the question "Can light escape from a black hole?" Similarly, we need to know what abortion is if we want to find out whether abortion is immoral.

Empirical questions are generally independent of evaluative questions. We do not have to consider any evaluative judgements if we want to answer an empirical question. However, the reverse is not true. To answer many evaluative questions, we need to know quite a few empirical facts. For example, to evaluate whether an action is morally right or wrong, we usually have to consider the consequences of the action, or the motives behind the action. Once we know these empirical facts, we can then apply the correct moral standards to judge whether the action is good or bad. Suppose we want to find out whether it was right for the US to drop two atomic bombs onto Japan. We have to consider empirical facts such as Japanese atrocities during the Second World War, the extent of the destruction caused by the atomic bombs, the number of
innocent civilians killed as a result, and whether there are other alternative ways of ending the war. These are all empirical matters which are important to consider in answering the questions.

Many disputes and controversies persist because of bad thinking, and bad thinking techniques might take the form of failure to understand the nature and type of the questions that have to be answered. The distinction between three types of questions discussed here is a simple and crucial part of the methodology in problem-solving.

**G01.4 Exercises**

Suppose "sexual harassment" is defined as any unwelcome sexual behavior or conduct which is offensive, humiliating or intimidating. How would you answer the question of whether telling sexual jokes constitutes sexual harassment?

Describe how you might answer the question of whether animals have languages.