Problem Solving Skills

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Appalachian State University

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Good problem solving skills

A good problem solving skill is usually seen as one which involves:

- developing creative and innovative solutions
- developing practical solutions
- showing independence and initiative in identifying problems and solving them
- applying a range of strategies to problem-solving
- applying problem-solving strategies across a range of areas

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What is a Problem?

- A problem is an opportunity for improvement
- A problem is the difference between the actual state and desired state
- A problem results from the recognition of a present imperfect and the belief in the possibility of a better future

"Every problem has a gift for you in its hands,"
Richard Bach**.**

An acronym combining the words "problem" and "opportunity", **probortunity**, is a reminder to look at problems as possible opportunities.

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What is a Problem?

- A problem could also be the result of the knowledge that there is a gap between the actual and desired or ideal state of objectives.

- Clarity of the problem is determined by the clarity of the knowledge of what precisely one wants and what one has. Greater clarity of the problem helps in finding a better and effective solution.

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What is a Problem?

- The belief that one's hopes can be achieved will give one the will to aim towards a better future.
- Hopes challenge one's potential, and challenge is another definition of a problem.

According to Robert Harris - When confronted with a problem, people are likely to adopt either of the two approaches – stop it or mop it.

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Stop It

A stop-it approach seeks to solve a problem, so that the problem no longer exists. Its three forms are prevention, elimination, and reduction.

- **Prevent It.** Preventing a problem from occurring or recurring is the most ideal solution.
- **Eliminate It.** Eliminating a problem once and for all is also an ideal way of attacking a problem.
- **Reduce It.** The magnitude of any problem can be lessened by reducing its size.

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Prevent It : Watching too much TV

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Eliminate It: Monster under the bed

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Reduce It:

To cut down on egg breakage, the Easter Bunny gets physical therapy to learn to walk instead of hop

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Mop It

A mop-it approach focuses on the effects of a problem. Instead of treating the leak itself, the water on the floor is mopped up - the effects of the problem.

- **Treat It.** Here the damage caused by the problem is repaired or treated.
- **Tolerate It.** In this form of mop-it approach, the effects of the problem are put up with.
- **Redirect It.** Here the problem is deflected. Sometimes the problem will simply be redefined as not a problem.

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Treating

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Tolerating

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Redirecting

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Problem solving is an ongoing activity

"No problem is ever totally solved. Every problem has a solution, but every solution with it brings a new problem. Some well-known management techniques emphasize the idea of continuous improvement and successful problem-solving is seen as part of such continuous improvement."

Prof. Jeff Malpas

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Problem solving is an ongoing activity

- Problem-solving is less a matter of continuous improvement as of continuous adjustment.
- Every solution will have unintended consequences.
- Every effective system gives rise to friction and failure.
- Problem-solving depend upon a willingness to adapt to the situation and recognize the effective.
- Problem-solving depend upon a willingness to adapt to the situation and recognize the ongoing and partial character of all attempts to manage or to solve.

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Just ask 'Why?'

"I roamed the countryside searching for answers to things I did not understand. Why shells exist on the tops of mountains along with imprints of plants usually found in the sea. Why thunder lasts longer than that which causes it. How circles of water form around the spot which has been struck by a stone. And how a bird suspends itself in the air. Questions like these engaged my thought throughout my life".

Leonardo da Vinci

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Causes of Poor Problem-Solving

Ineffective or poor problem-solving can be the result of any of the following factors. These factors act like blinkers, constricting the perspective of person in the process of problem-solving.

Bounded Rationality
Satisficing
Groupthink
Groupshift
Conformation Bias
Insufficiency of Hypotheses
Fixation
Other Obstacles

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Bounded Rationality

Propounded by Herbert Simon, the concept of bounded rationality assumes that individuals make decisions by constructing simplified models that extract the essential features from problems without capturing all their complexity.

Simon remarks that a majority of the people are only partly rational, and are in fact emotional/irrational in the remaining part of their actions. He indicates two major causes of bounded rationality:

a. Limitations of the human mind
b. The structure within which the mind operates

He states that boundedly rational people experience limits in formulating and solving problems. As a result, when calculating expected utility, people do not make the best choices.

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Example for Bounded Rationality

A person may choose to buy a particular brand of new cell-phone, based on the information he gathered from advertisements and friends. Constrained by bounded rationality, he will turn down even if he is offered a better bargain. Often, bounded rationality could also be caused by "inverted intelligence" - clever people who can easily argue that the information must be wrong.

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Satisficing

- Satisficing implies identifying and implementing a solution that is "good enough."
- According to Herb Simon, the tendency to 'satisfice' results in solving problems which do not lead to optimal solutions. Most often, people look for solutions that had worked for them before. There may be better ways to reach the outcome, but they simply ignore them.
- Why don't they go after an alternate (better) solution?

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Groupthink

- 'Groupthink' is a phenomenon in which the norm for consensus overrides the realistic appraisal of alternative courses of action. It describes situations in which group pressures for conformity discourage the group from critically appraising unusual, minority, or unpopular views.
- 'Groupthink' is a bug that strikes groups and can dramatically hinder their performance.

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Some of the symptoms of 'Groupthink'

- **Illusion of Invulnerability:** Members ignore obvious danger, take extreme risk and are overly optimistic.
- **Collective Rationalization:** Members discredit and explain away warning contrary to group thinking.
- **Illusion of Morality:** Members believe their decisions are morally correct, ignoring the ethical consequences of their decisions.
- **Excessive Stereotyping:** The group constructs negative stereotypes of rivals outside the group.
- **Pressure for Conformity:** Members pressure any in the group who express arguments against the group's stereotypes, illusions, or commitments, viewing such opposition as disloyalty.
- **Self-Censorship:** Members withhold their dissenting views and counterarguments.
- **Illusion of Unanimity:** Members perceive falsely that everyone agrees with the group's decision; silence is seen as consent.
- **Mindguards:** Some members appoint themselves to the role of protecting the group from adverse information that might threaten group complacency.

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Groupshift

'Groupshift' is a phenomenon in which the initial positions of individual members of a group are exaggerated toward a more extreme position. More often, however, the shift is toward greater risk.

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Why does Groupshift happen?

- Discussion creates familiarization among the members.
- People admire individuals who are willing to take risks.
- The most plausible explanation of the shift toward risk, however, seems to be that the group diffuses responsibility.
- Group decisions free any single member from accountability for the group's final choice.

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Conformation Bias

Conformation bias is the tendency on the part of the people to search only for that information that supports their perceived notions.

It is important to maintain objectivity in evaluating ideas so that they are not biased toward their initial perceptions.

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The possible solutions

- Considering alternative hypotheses - view the problem from different perspectives.
- Looking for evidence to disprove their ideas - showing that a particular idea is incorrect is as important as showing an idea is correct.
- Maintain objectivity while evaluating ideas to minimize personal bias.
- Drawing conclusions based upon the evidence, not upon their personal beliefs.

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Insufficiency of Hypotheses

Often, while solving problems, a solver seizes upon the first explanation that comes to mind and stops thinking about the problem. This difficulty is related to confirmation bias, but reflects insufficient thought applied to a problem.

To avoid poor problem-solving resulting from insufficiency of hypothesis, people should develop alternative ideas, rather than seizing upon the first idea as the solution.

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Fixation

Fixation is the inability to see a problem from a fresh perspective.

Structuring a problem incorrectly is a prime contributor to the inability to solve a problem correctly.

To overcome fixation, people should see the problem with "fresh eyes" - allow time for reflection and incubation.

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Other Obstacles

Problem-solving can be impaired by biases of personal beliefs, a misunderstanding of information relevant to solving problems, and overconfidence. The solution is to study a problem objectively with all available accurate information and use objective reasoning to achieve a reasonable, sound decision. People should be sure that they understand the problem and find what constitutes a solution. They should obtain as much accurate and comprehensive information from unbiased sources possible and maintain objectivity in evaluating ideas to minimize personal bias. They should assess their decisions critically and be able to defend their ideas.

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The story of the Gordian Knot

In 333BC, as Alexander the Great was leading his armies across Asia, he reached the city of Gordian in Phrygia. There he was shown the chariot of the ancient founder of the city, its pole lashed to the yoke by means of an intricate knot.

According to tradition, this knot was to be untied only by the future conqueror of Asia. Many had tried, and all had failed...

Legend has it that Alexander looked at the knot, drew his sword and sliced through the knot with a single blow. Shortly afterwards, under his rule, Asia was united for the first time.

The moral of this story: Sometimes it's better not to get too tied up in a problem. Leap for a bold solution!

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