Analogical Transfer Thinking

Idea In Short

A solution that works in one field often waits unnoticed in another. Experiments by Mary Gick and Keith Holyoak showed that people who read a story about a military problem could solve a medical puzzle with the same structure, yet most failed to see the link unless someone gave them a hint. The finding explains why companies reinvent what other industries solved years ago. Analogical transfer thinking is the deliberate practice of carrying a pattern from a source field into a target problem and adapting it. This article explains why the move is hard, what research says improves it, and how to practice it with discipline.

Every industry holds answers that other industries need. Airlines learned about checklists from surgery, and software teams borrowed manufacturing ideas for workflow. The pattern repeats, yet most organizations still struggle to use it on purpose. Analogical transfer thinking treats borrowing as a skill that you can train and manage. This article explains why transfer is difficult, what experiments reveal about making it work, and how teams can practice it with care.

The experiment that explains the problem

Cognitive psychologists have studied analogy for decades, and one classic study set the terms. In 1980, Mary Gick and Keith Holyoak asked people to solve Duncker's radiation problem, in which a doctor must destroy a tumor with rays without harming healthy tissue. Subjects who first read a story about a military problem tended to generate analogous solutions to the medical problem, provided they received a hint to use the story. When no hint came, the frequency of analogous solutions decreased markedly.1

The result carries a lesson for managers. The knowledge was in the room, because every participant had just read the story. The failure lay in noticing that the story applied. Teams face the same problem every day, since the solution sits in another department or industry

and nobody thinks to look.

The study also found limits on what transfers. When the military story differed substantially in structure from the medical problem, transfer fell, even though the story's solution would have worked. An analogy only helps when the relationships match, so a borrowed idea needs a structural check before anyone relies on it.

Surface and structure

People tend to retrieve examples that look alike. A marketer searches for ideas from other marketers, and a logistics manager searches for ideas from other logistics firms. Keith Holyoak and Kyunghee Koh examined the factors that influence the retrieval and use of analogies in problem solving. They noted that college students often fail to use analogies spontaneously, even when a relevant one sits in memory.2

This tendency creates a trap. If you search only among surface lookalikes, you find the ideas your competitors already use. The valuable analogies often sit in fields that look nothing like yours. A hospital emergency room and a motorsport pit crew share a structure, namely a fast handoff of a critical task among specialists, although the settings look entirely different.

The skill to build is abstraction. Strip the problem of its industry vocabulary and describe the pattern underneath. A problem that reads as "customers abandon our online checkout" may be a pattern of "people drop out when a process asks for too much effort too early." Once described that way, the pattern matches queues at airports, enrollment forms at clinics, and many other situations.

Schemas make recognition easier

If distant analogies are hard to notice, how can people improve? Gick and Holyoak followed their first study with research on schema induction. Their analysis predicted that people notice analogies through semantic retrieval cues and that inducing a general schema from concrete analogs would make transfer easier.3 A schema is a general description of the pattern that several examples share.

The practical move is to compare cases. Take two or three examples of a solved problem

from different fields and write down what they have in common. A team that studies how a convergence strategy worked in military encirclement, in a hospital triage line, and in a retail supply chain builds a pattern that is larger than any one example. The pattern then travels to new problems more easily than a single story does.

Training programs for analysts and consultants can use this directly. Instead of presenting one case study, present two or three that share a structure and ask participants to name the shared pattern. The exercise takes more effort than reading a single case, and it builds the habit of looking for structure.

A worked example from design

Biomimicry offers a vivid case of structural transfer. A design guide from the nonprofit VentureWell describes it as a rich form of design by analogy, and it uses Velcro as the standard example. Tiny hooks on one strip act like burrs, catching the fur-like loops on the matching strip.4 The guide stresses the point that matters here. Velcro does not look like a burr or a dog, yet it recreates their physics to produce strong adhesion.

Other cases follow the same logic. Janine Benyus, author of the book Biomimicry, told a Wharton audience that drag reducers copied the denticles of sharkskin, and that radar was modeled on the sonar of bats and dolphins.5 In each case the designers took a working mechanism from a distant domain and rebuilt its principle with different materials.

Business problems allow the same method. Ask what natural, industrial, or social system has already solved a problem with your structure. A company that must route thousands of requests to scarce experts may study how ants allocate foragers, or how air traffic control assigns runways. The source need not match your industry. It only needs to match your structure.

A method for transfer

A reliable process has five steps. First, state the problem in abstract terms, naming the actors, the constraint, and the goal without industry vocabulary. Second, ask where else this structure appears, and list at least three fields that look nothing like yours. Third, study how each field solved the problem, paying attention to the mechanism and not the detail.

Fourth, map the elements across. Write down what plays the role of the customer, the scarce resource, and the control point in the source and in your case. Gaps in the map show where the analogy breaks. Fifth, design a small test of the borrowed idea in your own setting, with a clear measure of success.

The map step deserves extra care. An analogy can feel convincing because of a few matching features, while the mechanism differs underneath. Write the relationships out in a table, and check whether each relationship holds in the target. If two or three key relationships fail, the analogy is decoration and not a guide.

Where to look for sources

Teams often ask where to find good source fields. Start with places where the pressure on a similar problem is extreme. Emergency medicine, aviation, and logistics all face tight timing, high stakes, and constant handoffs, so they have refined many solutions that office work could use. Nature offers another deep library, since living systems have faced resource limits for a very long time.

A simple habit helps. Keep a shared notebook of patterns with three columns: the structure, the field where it works, and a one line description of the mechanism. Add to it whenever someone reads about a clever solution outside the team's field. When a new problem appears, scan the notebook first, because a prepared library makes the hint that the experiments found so valuable available on demand.

Risks and cautions

Analogical transfer has risks. A weak analogy can lead a team to copy features that do not suit the new setting, and the failure may arrive after real money goes out. The best protection is the pilot, because it tests the idea against reality before commitment.

Another risk is the story effect. A vivid analogy, such as a famous turnaround or a sports team, can persuade a room without proving anything. Ask what evidence supports the claim that the source and the target share the same causes. If the answer is only that the story feels right, treat the idea as a hypothesis.

Finally, remember that transfer works best with depth in at least one field. People who know

a source domain well can see its mechanisms, and people who know the target domain well can judge which mechanisms fit. Pair experts from both sides, and let them argue about the map. The disagreements will show you where the analogy holds and where it fails.

- 1Analogical problem solving
- 2Surface and structural similarity in analogical transfer
- 3Schema induction and analogical transfer
- 4Biomimicry
- 5Learning from sharks and spiders: the hand of nature in innovation

Summary

Analogical transfer rewards teams that look past surface features and match deep structure. Gick and Holyoak found that transfer fell sharply without a hint, and that distant stories only helped when people noticed the relationship. Later work pointed to schemas, formed by comparing examples, as a way to make recognition easier. Design practice such as biomimicry shows the payoff, since Velcro copied the physics of a burr and not its look. Before your next planning session, state your problem in abstract terms, search two unrelated fields for the same structure, and test the borrowed idea in a small pilot before you scale it.