Satisficing

It is often preferable to settle for a satisfactory solution, rather than pursue an optimal solution.[1]

The best design decision is not always the optimal design decision. In certain circumstances, the success of a design is better served by design decisions that roughly satisfy (i.e., satisfice), rather than optimally satisfy, design requirements. For example, in seeking for the proverbial needle in a haystack, a satisficer would stop looking as soon as a needle is found; an optimizer would continue to look for all possible needles so that the sharpest needle could be determined. There are three kinds of problems for which satisficing should be considered: very complex problems, time-limited problems, and problems for which anything beyond a satisfactory solution yields diminishing returns.[2]

Complex design problems are characterized by a large number of interacting variables and a large number of unknowns. In working with such problems, a satisficer recognizes that the combination of complexity and unknowns makes an optimal solution unlikely (if not impossible). The satisficer, therefore, seeks a satisfactory solution that is just better than existing alternatives; the satisficer seeks only to incrementally improve upon the current design, rather than to achieve an optimal design.

Time-limited problems are characterized by time frames that do not permit adequate analysis or development of an optimal solution. In cases where optimality is secondary to urgency, a satisficer selects the first solution that satisfactorily meets a given design requirement. Note that satisficing should be cautiously applied in time-limited contexts, especially when the consequences of a suboptimal solution can have serious consequences.[3]

There are cases in which a satisfactory solution is better than an *optimal* solution—i.e., solutions beyond the satisfactory yield diminishing returns. Determining when satisfactory is best requires accurate knowledge of the design requirements, and accurate knowledge of the value perceptions of the users. A satisficer weighs this value perception in the development of the design specification, ensuring that optimal specifications will not consume design resources unless they are both critical to success, and accorded value by users.[4]

Consider satisficing as a means of making design decision when problems are complex with many unknowns, when problems need to be solved within a narrow time frame, and when developing design requirements and specifications. Generally, do not accept satisficed solutions that are inferior to previous or existing solutions. In time-limited contexts, consider satisficing only when the limited timelines are truly fixed, and the consequences of low-quality design and increased risk of failure are acceptable.

See also 80/20 Rule, Chunking, Cost-Benefit, Iteration, and Not Invented Here.

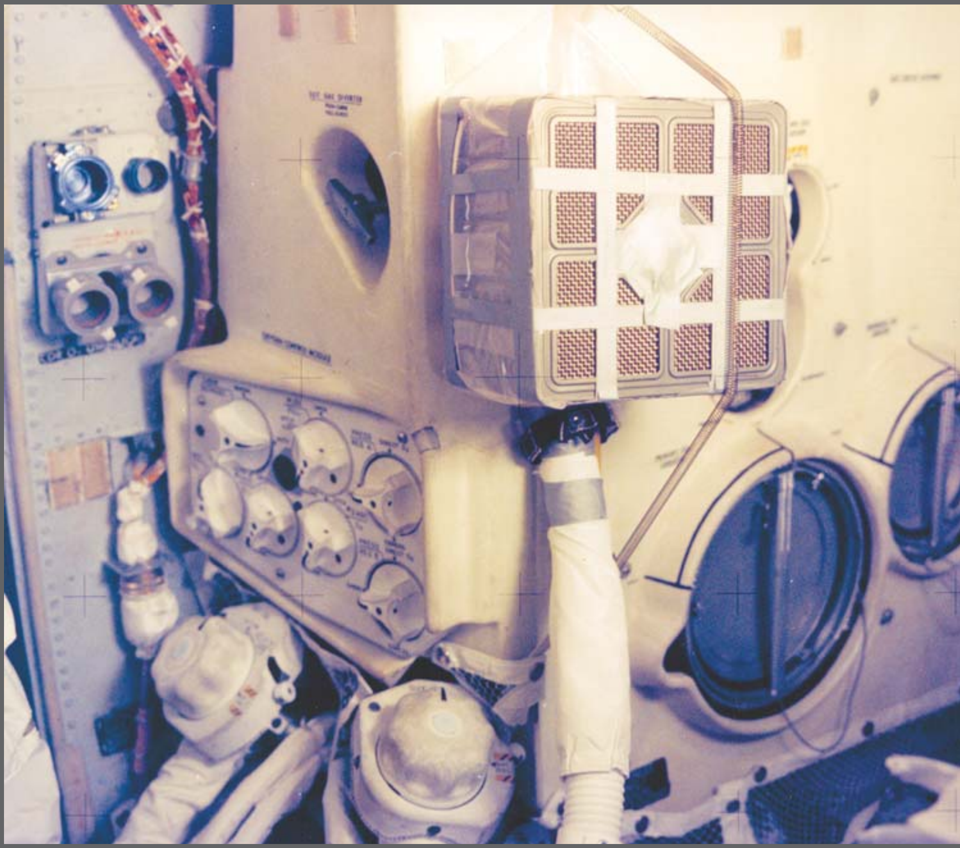
[1] Also known as *best is the enemy of the good principle*.

[2] The seminal works on satisficing are *Models of Man*, John Wiley & Sons, 1957; and *The Sciences of the Artificial*, MIT Press, 1969, both by Herbert A. Simon.

[3] In many time-limited contexts, the time limits are artificial (i.e., set by management), whereas the consequences of low-quality design and system failure are real. See, for example, *Crucial Decisions: Leadership in Policymaking and Crisis Management* by Irving Janis, Free Press, 1989.

[4] For example, designers at Swatch realized that watches of increasing accuracy were no longer of value to consumers—i.e., accuracy to within one minute a day was accurate enough. This "good enough" standard allowed the designers of Swatch to focus their efforts on style and cost reduction, rather than on further optimizing the timekeeping of their watches.

The *adapted* square carbon dioxide filter from the command module (center), and round filter receptacle of the lunar lander (lower right).



The *Apollo 13* Mission to the moon launched at 2:13 P.M. EST on April 11, 1970. An electrical failure occurred in the command module of the spacecraft 56 hours into the flight, causing the mission to be aborted and forcing the three-person crew to take refuge in the lunar lander. The carbon dioxide filters aboard the lunar lander were designed to support two people for two days—the planned duration of a lunar landing—and not the three people for four days needed to return the crew safely to Earth. The square carbon dioxide filters of the abandoned command module had the capacity to filter the excess carbon dioxide, but did not fit into the round filter receptacle of the lunar lander. Using materials available on the spacecraft such as plastic bags, cardboard from log books, and duct tape, NASA engineers designed a makeshift adapter for the square command module filters. The ground crew talked the astronauts through the construction process, and the adapted filters were put into service immediately thereafter. The solution was far from optimal, but it was satisfactory—it eliminated the immediate danger of carbon dioxide poisoning, and allowed ground and flight crews to focus on other critical problems. The crew of *Apollo 13* returned safely home at 1:07 P.M. EST on April 17, 1970.

Astronaut John L. Swigert Jr., hooking up the *adapted* carbon dioxide filters.