

Evidence-based targets for problem solving

| Evidence-based targets | Progress toward internalizing these targets | | | | |
|--|---|-----|-----|-----|------|
| | 20% | 40% | 60% | 80% | 100% |
| M Spend time reading the problem statement. (Up to three times longer than unsuccessful problem solvers) (11, 24) | | | | | |
| M Define the problem well; do not solve the wrong problem. Be willing to spend up to half the available time defining the problem . Most mistakes made by unsuccessful problem solvers are made in the define stages (1, 3, 4, 11, 12, 19, 24) | | | | | |
| M You solve your mental image of the problem; such a mental image is called the <i>internal representation of the problem</i> . | | | | | |
| M Differentiate between <i>exercise solving</i> and <i>problem solving</i> . | | | | | |
| M Unsuccessful problem solvers tend to search for an equation that <i>uses up</i> all of the given variables. (1, 4, 11, 12, 14, 24) whereas successful problem solvers focus on an organized strategy that focuses on defining the real problem. | | | | | |
| M Unsuccessful problem solvers tend to memorize and try to recall equations and solutions that match the situation instead of defining the real problem and identifying key fundamentals. (11, 6) | | | | | |
| M Defining the problem is a three-stage activity (19, 24). | | | | | |
| M Unsuccessful problem solvers tend to take a trial and error approach; successful problem solvers use a systematic strategy (6). Use a strategy to help you to be systematic and organized | | | | | |
| M A strategy consists of a series of about 6 stages. Each stage uses different thinking and feelings. This strategy is not used serially (following rigidly one step after another). Rather it is used flexibly; applied many times while solving a single problem with frequent recycling from one stage to another. (24) | | | | | |
| M Problem solving skill interacts with subject knowledge (needed to solve the problem) and with the sample solutions (from past solved problems). | | | | | |
| M Successful problem solvers monitor their thought processes about once per minute while solving problems. (20, 19) | | | | | |

References 1 to 24 are from the Novice versus expert research summarized in PS News 55