

## How Novices and Experts Solve Problems

<b>Novices</b>	<b>Scale</b>	<b>Experts</b>
Starts solving a problem before fully understanding what is wanted and/or what a good route for solution will be	(1) – (2) – (3) – (4) – (5)	Reviews the entire plan outlined in Figure 2.3, mentally explores alternative strategies, and clearly understands what result is to be obtained
Focuses only on a known problem set that he or she has seen before and tries to match the problem with one in the set	(1) – (2) – (3) – (4) – (5)	Concentrates on similarities to and differences from known problems; uses genetic principles rather than problem matching
Chooses one procedure without exploring alternatives	(1) – (2) – (3) – (4) – (5)	Examines several procedures serially or in parallel
Emphasizes speed of solution, unaware of blunders	(1) – (2) – (3) – (4) – (5)	Emphasizes care and accuracy in the solution
Does not follow an organized plan of attack; jumps about, and mixes problem-solving strategies	(1) – (2) – (3) – (4) – (5)	Goes through the problem-solving process step by step, checking, reevaluating, and recycling from dead ends to other valid paths
Is unaware of missing data, concepts, laws	(1) – (2) – (3) – (4) – (5)	Knows what principles might be involved and where to get missing data
Exhibits bad judgment, makes unsound assumptions	(1) – (2) – (3) – (4) – (5)	Carefully evaluates the necessary assumptions
Gives up solving the problem because he or she does not know enough	(1) – (2) – (3) – (4) – (5)	Knows what the difficulty is and is willing to learn more that will provide the information needed
Gives up solving the problem because he or she does not have skills to branch away from a dead-end strategy	(1) – (2) – (3) – (4) – (5)	Aware that a dead end may exist for a strategy and has planned alternative strategies if a dead end is reached
Is unable to make approximations or makes bad ones	(1) – (2) – (3) – (4) – (5)	Makes appropriate approximations
Cannot conceive of disagreeing	(1) – (2) – (3) – (4) – (5)	Disagrees with other experts
Slavishly follows instructions; proceeds "by the book"	(1) – (2) – (3) – (4) – (5)	Breaks rules and makes exceptions
Does not know what to make of qualitative data	(1) – (2) – (3) – (4) – (5)	Is able to deal with qualitative data
Ignores possible limits	(1) – (2) – (3) – (4) – (5)	Recognizes limits
Fritters times way	(1) – (2) – (3) – (4) – (5)	Manages time well