

**Hubert Dreyfus and Stuart Dreyfus**  
***Mind Over Machine:***  
***The Power of Human Intuition and Expertise in the Era of the Computer***  
**(New York: The Free Press, 1986), p. 50**

**Table 1-1. Five Stages of Skill Acquisition**

<i>Skill Level</i>	<i>Components</i>	<i>Perspective</i>	<i>Decision</i>	<i>Commitment</i>
1. Novice	Context-free	None	Analytical	Detached
2. Advanced beginner	Context-free and <b>situational</b>	None	Analytical	Detached
3. Competent	Context-free and situational	<b>Chosen</b>	Analytical	Detached understanding and deciding. <b>Involved in outcome</b>
4. Proficient	Context-free and situational	<b>Experienced</b>	Analytical	<b>Involved understanding.</b> Detached deciding
5. Expert	Context-free and situational	Experienced	<b>Intuitive</b>	<b>Involved</b>

“Beyond rationality”

5b. Flow	Context-free and situational	Experienced	Intuitive	Involved; <b>non-monitoring</b>
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**What is Moral Maturity?**  
**A Phenomenological Account of the Development of Ethical Expertise**  
**Hubert L. Dreyfus**  
**Section: A Phenomenology of Skill Acquisition**

**A Phenomenology of Skill Acquisition**

**Stage 1: Novice**

Normally, the instruction process begins with the instructor decomposing the task environment into context-free features which the beginner can recognize without benefit of experience. The beginner is then given rules for determining actions on the basis of these features, like a computer following a program.

The student automobile driver learns to recognize such interpretation-free features as speed (indicated by his speedometer). Timing of gear shifts is specified in terms of speed.

The novice chess player learns a numerical value for each type of piece regardless of its position, and the rule: "Always exchange if the total value of pieces captured exceeds the value of pieces lost." But such rigid rules often fail to work. A loaded car stalls on a hill; a beginner in chess falls for every sacrifice.

## Stage 2: Advanced beginner

As the novice gains experience actually coping with real situations, he begins to note, or an instructor points out, perspicuous examples of meaningful additional components of the situation. After seeing a sufficient number of examples, the student learns to recognize them. Instructional maxims now can refer to these new situational aspects. We use the terms maxims and aspects here to differentiate this form of instruction from the first, where strict rules were given as to how to respond to context-free features. Since maxims are phrased in terms of aspects they already presuppose experience in the skill domain.

The advanced beginner driver uses (situational) engine sounds as well as (non-situational) speed. He learns the maxim: shift up when the motor sounds like it is racing and down when it sounds like it is straining. No number of words can take the place of a few choice examples of racing and straining sounds.

Similarly, with experience, the chess student begins to recognize such situational aspects of positions as a weakened king's side or a strong pawn structure, despite the lack of precise definitional rules. He is then given maxims to follow, such as attack a weakened king's side.

## Stage 3: Competence

With increasing experience, the number of features and aspects to be taken into account becomes overwhelming. To cope with this information explosion, the performer learns to adopt a hierarchical view of decision-making. By first choosing a plan, goal or perspective which organizes the situation and by then examining only the small set of features and aspects that he has learned are relevant given that plan, the performer can simplify and improve his performance.

A competent driver leaving the freeway on a curved off-ramp may, after taking into account speed, surface condition, criticality of time, etc., decide he is going too fast. He then has to decide whether to let up on the accelerator, remove his foot altogether, or step on the brake. He is relieved when he gets through the curve without mishap and shaken if he begins to go into a skid.

The class A chess player, here classed as competent, may decide after studying a position that his opponent has weakened his king's defenses so that an attack against the king is a viable goal. If the attack is chosen, features involving weaknesses in his own position created by the attack are ignored as are losses of pieces inessential to the attack. Removing pieces defending the enemy king becomes salient. Successful plans induce euphoria and mistakes are felt in the pit of the stomach.

In both of these cases, we find a common pattern: detached planning, conscious assessment of elements that are salient with respect to the plan, and analytical rule-guided choice of action, followed by an emotionally involved experience of the outcome. The experience is emotional because choosing a plan, goal or perspective is no simple matter for the competent performer. Nobody gives him any rules for how to choose a perspective, so he has to make up various rules which he then adopts or discards in various situations depending on how they work out. This procedure is frustrating, however, since each rule works on some occasions and fails on others, and no set of objective features and aspects correlates strongly with these successes and failures. Nonetheless the choice is unavoidable. Familiar situations begin to be accompanied by emotions such as hope, fear, etc., but the competent performer strives to suppress these feelings during his detached choice of perspective.

One of us, Stuart, knows all too well what it is to think like a competent chess player, as he is stuck at that level. He recalls:

*I was always good at mathematics and took up chess as an outlet for that analytic talent. At college, where I captained the chess team, my players were mostly mathematicians and mostly, like me, at the competent level. At this point, a few of my teammates who were not*

*mathematicians began to play fast chess at the rate of five or ten minutes a game, and also eagerly to play over the great games of the grandmasters. I resisted. Fast chess was no fun for me, because it didn't give me time to figure out what to do. I found grandmaster games inscrutable, and since the record of the game seldom if ever gave principles explaining the moves, I felt there was nothing I could learn from the games. Some of my teammates, who through fast chess and game studying acquired a great deal of concrete experience, have gone on to become masters.*

#### **Stage 4: Proficiency**

As soon as the competent performer stops reflecting on problematic situations as a detached observer, and stops looking for principles to guide his actions, the gripping, holistic experiences from the competent stage become the basis of the next advance in skill. Having experienced many emotion-laden situations, chosen plans in each, and having obtained vivid, emotional demonstrations of the adequacy or inadequacy of the plan, the performer involved in the world of the skill "notices," or "is struck by" a certain plan, goal or perspective. No longer is the spell of involvement broken by detached conscious planning.

Since there are generally far fewer "ways of seeing" than "ways of acting," after understanding without conscious effort what is going on, the proficient performer will still have to think about what to do. During this thinking, elements that present themselves as salient are assessed and combined by rule and maxim to produce decisions.

On the basis of prior experience, a proficient driver fearfully approaching a curve on a rainy day may sense that he is traveling too fast. Then, on the basis of such salient elements as visibility, angle of road bank, criticalness of time, etc., he decides whether to let up on the gas, take his foot off the gas or to step on the brake. (These factors were used by the competent driver to decide that he is speeding.)

The proficient chess player, who is classed a master, can discriminate a large repertoire of types of positions. Experiencing a situation as a field of conflicting forces and seeing almost immediately the sense of a position, he sets about calculating the move that best achieves his goal. He may, for example, know that he should attack, but he must deliberate about how best to do so.

#### **Stage 5: Expertise**

The proficient performer, immersed in the world of skillful activity, sees what needs to be done, but must decide how to do it. With enough experience with a variety of situations, all seen from the same perspective but requiring different tactical decisions, the proficient performer seems gradually to decompose this class of situations into subclasses, each of which share the same decision, single action, or tactic. This allows an immediate intuitive response to each situation.

The expert driver, generally without any attention, not only knows by feel and familiarity when an action such as slowing down is required; he knows how to perform the action without calculating and comparing alternatives. He shifts gears when appropriate with no awareness of his acts. On the off ramp his foot simply lifts off the accelerator. What must be done, simply is done.

The expert chess player, classed as an international master or grandmaster, in most situations experiences a compelling sense of the issue and the best move. Excellent chess players can play at the rate of 5-10 seconds a move and even faster without any serious degradation in performance. At this speed they must depend almost entirely on intuition and hardly at all on analysis and comparison of alternatives. We recently performed an experiment in which an international master, Julio Kaplan, was required rapidly to add numbers presented to him audibly at the rate of about one number per second, while at the same time playing five-second-a-move chess against a slightly weaker, but master level, player. Even with his analytical mind completely occupied by adding numbers, Kaplan more than held his own against the

master in a series of games. Deprived of the time necessary to solve problems or construct plans, Kaplan still produced fluid and strategic play.

It seems that beginners make judgments using strict rules and features, but that with talent and a great deal of involved experience the beginner develops into an expert who sees intuitively what to do without applying rules and making judgments at all. The intellectualist tradition has given an accurate description of the beginner and of the expert facing an unfamiliar situation, but normally an expert does not deliberate. He does not reason. He does not even act deliberately. He simply spontaneously does what has normally worked and, naturally, it normally works.

We are all experts at many tasks and our everyday coping skills function smoothly and transparently so as to free us to be aware of other aspects of our lives where we are not so skillful. That is why philosophers (with the exception of Aristotle) overlooked them for 2500 years, until pragmatism and existential phenomenology came along.

John Dewey introduced the distinction between knowing-how and knowing-that to call attention to just such thoughtless mastery of the everyday:

We may ... be said to know how by means of our habits. ... We walk and read aloud, we get off and on street cars, we dress and undress, and do a thousand useful acts without thinking of them. We know something, namely, how to do them. ... [I]f we choose to call [this] knowledge ... then other things also called knowledge, knowledge of and about things, knowledge that things are thus and so, knowledge that involves reflection and conscious appreciation, remains of a different sort ...<sup>i</sup>

Heidegger calls our transparent dealing with ready-to-hand equipment, circumspection, and considers it our basic way of being-in-the-world.<sup>ii</sup> We should try to impress on ourselves what a huge amount of our lives -- working, getting around, talking, eating, driving, and responding to the needs of others -- manifest know-how, and what a small part is spent in the deliberate, effortful, subject/object mode of activity which requires knowing-that. Yet deliberate action and its extreme form, deliberation, are the ways of acting we tend to notice, and so are the only ones that have been studied in detail by philosophers.

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<sup>i</sup> John Dewey, *Human Nature and Conduct. An Introduction to Social Psychology*, London: George Allen and Unwin, 1922, pp. 177-178.

<sup>ii</sup> Heidegger's phenomenology of everyday skill is discussed in detail in Hubert L. Dreyfus, *Being in the World: A commentary on Heidegger's BEING & TIME*, M.I.T. Press.