

Stages of Skill Acquisition

Individuals make their way from beginner to expert via three characteristic stages for skill acquisition (or the learning process) as follows: cognitive, associative, and automaticity. An instructor needs to recognize each stage in learner performance in order to assess progress.

Cognitive Stage

Cognitive learning has a basis in factual knowledge. Since the learner has no prior knowledge of flying, the instructor first introduces him or her to a basic skill. The learner then memorizes the steps required to perform the skill. As the learner carries out these memorized steps, he or she is often unaware of progress, or may fixate on one aspect of performance. Performing the skill at this stage typically requires all the learner's attention; distractions introduced by an instructor often cause performance to deteriorate or stop.

The best way to prepare the learner to perform a task is to provide a clear, step-by-step example. Having a model to follow permits learners to get a clear picture of each step in the sequence so they understand what is required and how to do it. In flight or maintenance training, the instructor provides the demonstration, emphasizing the steps and techniques. During classroom instruction, an outside expert may be used, either in person or in a video presentation. In any case, learners need to have a clear impression of what they are to do.

For example, Beverly enters a steep turn after increasing power by a prescribed amount and adjusting the pitch trim. She fixates on the attitude indicator as she attempts to achieve the desired bank angle. The bank angle exceeds tolerances as she struggles to correct it, making many abrupt control inputs.

Associative Stage

Even demonstrating how to do something does not result in the learner learning the skill. Practice is necessary in order for the learner to learn how to coordinate muscles with visual and tactile senses. Learning to perform various aircraft maintenance skills or flight maneuvers requires practice. Another benefit of practice is that as the learner gains proficiency in a skill, verbal instructions become more meaningful. A long, detailed explanation is confusing before the learner begins performing, whereas specific comments are more meaningful and useful after the skill has been partially mastered.

As the storage of a skill via practice continues, the learner understands how to associate individual steps in performance with likely outcomes. The learner no longer performs a series of memorized steps, but is able to assess his or her progress along the way and make adjustments in performance. Performing the skill still requires deliberate attention, but the learner is better able to deal with distractions.

For example, Beverly enters the steep turn and again struggles to achieve the desired bank angle. Still working on the bank angle, she remembers the persistent altitude control problem and glances at the altimeter. Noticing that the aircraft has descended almost 100 feet, she increases back pressure on the control and adjusts the trim slightly. She goes back to a continuing struggle with the bank angle, keeping it under control with some effort, and completes the turn 80 feet higher than started.

Automatic Response Stage

Automaticity is one of the by-products of practice. As procedures become automatic, less attention is required to carry them out, so it is possible to do other things simultaneously, or at least do other things more comfortably. By this stage, learner performance of the skill is rapid and smooth. The learner devotes much less deliberate attention to performance, and may be able to carry on a conversation or perform other tasks while performing the skill. The learner makes far fewer adjustments during his or her performance and these adjustments tend to be small. The learner may no longer be able to remember the individual steps in the procedure, or explain how to perform the skill.

For example, the learner smoothly increases power, adds back pressure on the yoke, and trims the aircraft as a turn is entered. During the turn, the instructor questions the learner on an unrelated topic. The learner answers the questions, while making two small adjustments in pitch and trim, and then rolls out of the turn with the altimeter centered on the target altitude. Noting the dramatically improved performance, the instructor asks "What are you doing differently?" The learner seems unsure and says, "I have developed a feel for it."