



Skills Development

BONNIE KRATZ

Teaching motor skills takes trial and error

BY ROGER J. PELLETIER, MCFI (2000-2004)

When we say we are teaching someone the skill of flying, do we have a clear idea as to exactly how this skill is developed? As instructors, a clear understanding of what skill-training entails when we teach someone to fly should help us guide the learning process.

Learning how to fly an airplane is a daunting task for the novice. Of

the different facets of learning how to fly, the most challenging must be the learning of a completely new motor skill. For many, this might be the first since childhood—and I wager you do not remember the process, or your state of mind, when you learned how to walk, swim, or pedal a two-wheeled bike. Yet, understanding the developmental stages involved when we learn

a motor skill can help us identify hindrances and facilitators for learning how to fly.

Flying is a mental process associated with muscular motor skills. For example, landing an airplane smoothly on the center line of the runway requires not only a cognitive effort, but also the necessary motor skills to make it happen. This motor skill represents a series of muscular movements controlled by a neural motor program in the brain. The construction and utilization of these new neural programs follows a series of stages in development.

First Steps

The first stage in learning a new skill is the beginning, or cognitive, stage. This includes reading and attending classes to develop the fundamental knowledge necessary to fly. Analogous to your two-wheel bike skills, this would be your friends describing how to pedal the bike upright and smoothly. In the air, of course, it includes the instructor describing on the ground and coaching the student in the air on how to land an airplane.

The second stage, or intermediate, is the associative. These cognitive ideas and goals must be turned into a means of action that is, a motor skill. This is accomplished by developing, in the brain, a new neural motor program necessary to actuate the proper muscular movements of the body. However, as learning how to ride a two-wheel bike as a youngster reveals, you could read about and your friends could describe how to balance a bike in a million ways, but until you physically started trying to balance a bike yourself, you wouldn't make any progress in developing these neural motor programs. When your students first start the actual process of flying the airplane, they have moved into the associative stage of motor learning, which implies using cognitive attention and physical use of their developing motor skills to fly the plane successfully.

Eventually, in the last stage, aptly

called the advanced stage, their experience, through trial and error, has now developed the properly fine-tuned neural motor program that can control and execute the muscular coordination necessary for riding the bike or landing the airplane without conscious effort. I don't mean to imply they no longer need to be conscious to land the airplane, but what Yogi Berra had in mind when he said, "How can you think and hit at the same time?"

With their motor-skill development matured, they no longer need to consciously think of how much rudder pressure they need to keep the plane's nose straight on landing; they intuitively know to add a little, a little more, or a lot. As a matter of fact, we've all experienced students who have developed to a particular level of skill but are now "thinking about it too much," and they've temporarily lost their ability. That's because con-

scious effort now interferes with the execution of the neural motor program. With mature motor-skill development, your eye receives visual cues, such as the airplane's nose orientation, and your right foot automatically applies the necessary pressure to keep the nose straight. The same applies for the back pressure on the yoke to keep the nose wheel off the ground in the flare, and on landing, the student's hand applies just the right amount of back pressure.

In this last stage, a neuromuscular activity is executed without conscious attention to these "little" details. Their conscious attention can focus on the issues of which runway they are going to land on, what the crosswinds are, and what safety issues should be addressed.

Trial and Error

The development of any muscular

motor skill, whether it's learning to fly or to ride a two-wheel bike, has to go through these stages of learning. The period of trial and error necessary to set up the appropriate neuromuscular motor pattern is an important part of that learning process. You probably don't remember how many times you fell off when trying to learn to ride a bike. So it is with the airplane. Your student needs those multiple touch-and-goes to build up so she can fine-tune the motor patterns necessary to smoothly land the airplane in a consistent and safe manner.

A child seems to learn a new motor skill effortlessly. For adults, though, learning a new motor skill is often not so easy. A major reason for these difficulties is that adults, unlike the child, approach learning with preconceived ideas. A child will repeat a motor skill until it is developed; he doesn't care how many times he falls off the bike.



Demo pilots with attitude.

Introducing accomplished CIRRUS demo pilots who travel throughout the country educating CFIs and flight schools about the award-winning CIRRUS SR22-G2.™ No matter where you are, they'll fly with you and show you the amazing features of the CIRRUS. See for yourself why CIRRUS is the best-selling aircraft on the market. We bet you'll be left with a smile. And, if you refer a student, colleague or associate, you could receive \$1,000 [and even a bigger smile].

Contact CIRRUS for your free demonstration flight at 888.450.4811 or visit us online at cirrusdesign.com

THE MIND OF AN ENGINEER.
THE HEART OF A PILOT.



There is no shame, anxiety, or guilt tied to the failed effort. Accordingly, much anecdotal evidence exists, from instructors of swimming, musical instrument playing, and flying, that youngsters and young adults are generally faster to pick up these skills than older adults. Adults just bring more baggage to the lesson.

Hence, for students learning the motor aspect of flying—but especially for adults—the most important means by which those students can help themselves is to come to the lesson with what is called a beginner's mind. They should try to eliminate as much as possible their adult egoism with its culturally colored views. This isn't an easy task, but that is the goal to work toward.

Examples of this detrimental, egoistic thought includes concern for the rate of achievement—that is, how long will it take for them to solo when their classmate soloed in only 10 hours? Fear of failure—including dwelling on how stupid they will feel if they cannot learn these skills—is another. People often go through a series of arguments justifying their own limitations: I can't do that, I can't help it, or I've always been that way. How am I going to learn all the complexities of the cockpit setup?

Our minds have immense power to influence our outlook on the world. When we decide that something is true or beyond our reach, it is very difficult to pierce through this self-imposed hurdle, and we will look for examples to confirm our expectations. The student will concentrate on supposed limitations that will frighten him and hinder him from trying. In order to become a pilot, or learn anything new for that matter, the first step is for the student to silence his greatest critic—himself.

The student's goal should be to come to your flying lesson with a mind as empty of anxiety and fear as possible. I'm not talking about a heightened sense of awareness—that

is actually a good thing—but high anxiety levels, fear of flying, fear of heights, and thoughts associating flying and accidents will all surely hinder her ability to learn. The body under a state of anxiety is in the physiological state of fight or flight, which short-circuits the sympathetic nervous system and raises blood pressure, increases respiration and heart rate, and produces muscle tension. All of these are detrimental to smooth, coordinated muscle movements.

Your friends could describe how to balance a bike in a million ways, but until you physically started trying to balance a bike yourself, you wouldn't make any progress. . .

Anxiety sets off this automatic response that, even at the most innocuous level, cancels or interferes with an existing mental program that executes a motor skill, no matter how well the activity has been learned. On a developing pilot, the effects of anxiety will disrupt and prevent the formation of motor patterns necessary for a skill at all. Likewise, students should also come to the flying lesson with a mind as free of stress as possible. The body responds to stress in a manner similar to anxiety. If the student is "spazzed out" by work issues, school exams, or family or girlfriend is-

sues, his mind and body will not be in a relaxed state, ready to form these new neural motor patterns.

Learning the skill of flying an airplane requires a childlike state of mind as much as possible; we should encourage our students to come to each lesson relaxed, without the fear of failure, anxiety, and stress. While flying, encourage them do the best they can, but assure them that they will make mistakes, that mistakes are an integral part of learning any new motor skill, and that intelligence, per se, plays a very minor role, if at all, in the development of a motor skill.

Explain that they, under your guidance, are actually building and fine-tuning eye-hand muscular motor programs necessary to fly an airplane expertly and safely, so they should do the best they can on each flight. Most importantly, they should not dwell on mistakes. The student needs to return to the next lesson secure in the knowledge that, with time, these skills will form.

The motor-skill aspect of learning to fly—as with the development of other motor skills—does not occur by leaps and bounds. Even though students may try hard, the progress they make is always little by little. As in a fog, you do not know you are getting wet, but as you walk, you get wet little by little until you are completely soaked.

One day your student will realize she can pilot an aircraft smoothly, with grace and finesse. Once learned, that skill will be seared into her mind, never to be forgotten. A beginner's mind used with full sincerity and effort at each moment is enough. Before either of you realize it, your student's dream of piloting an airplane effortlessly will have come true.

Roger Pelletier works as a full-time flight instructor for Franklin Aviation at Cincinnati's Lunken Airport. He specializes in primary, instrument, and high-performance instruction. ■