

THE LEARNING CURVE

BY

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One of the clichés of learning that every teacher gets exposed to is the so-called “learning curve.” This device is a graph that plots some measure of “learning accomplished” on the horizontal axis against “time” on the vertical. In other words, it is supposed to be a graph that shows the rate at which a student learns.

This graph shows the rate of learning to be very fast in the beginning of any learning task. Then the curve levels off, the slope of the graph becoming shallower, showing that the rate of learning has decreased. This flat part of the graph is known as a “plateau.”

The plateau is considered a normal part of the learning process. It is followed by an improvement in the rate of learning, but the graph never gets as steep after that first plateau as it was in the beginning, at “time zero.”

Another aspect of the learning curve is that the material learned in the beginning, where learning is occurring the fastest, is also learned the most thoroughly. Material learned at this part of the curve is most likely to be retained, and it is therefore important that the teacher make sure that this initial learning is correct, and that it leads to further effective acquiring of knowledge and skill.

In the initial stages of flight training, an instructor would do well to stress some simple but basic learning tasks. Using a written check list is an example of such a task. Looking before

turning, watching out for traffic, holding the control wheel with only one hand, and clearing the final approach course before turning base-to-final or before taxiing onto an active runway are other examples that come to mind. Turning up the volume of the VOR receiver and confirming that there is a good audio signal is a habit I was not taught properly from the get-go, and it was like pulling teeth trying to break the bad habit to replace it with the good one, years later. A little nit-picking goes a long way in effective instruction in the first ten hours or so of learning to fly.

I identify normal plateaus as being times when a number of pieces have to come together. Just before a student makes his initial solo flight, for example, he must integrate the previous blocks of learning into an operating whole. The basic skills of stick-and-rudder flying must be combined with those of flying ground reference maneuvers. The pilot must divide his attention and prioritize tasks so that things happen in the traffic pattern in a logical flow. He must develop an awareness of where other airplanes are, as well as listening carefully for his call sign on the radio. He must be aware when he is approaching his key positions in the pattern, and respond appropriately when he reaches those locations.

This integration of learning is difficult at first, and usually brings on the first major learning plateau. Typically, this plateau ends when the student makes his first solo flight. After that happens, he is jumping for joy, his motivation is sky-high, and he can't wait to get on with his training. The rate of learning increases drastically, even though it will never again reach the heady slope of the curve in the initial stages when the student

was learning bits and pieces and not having to integrate tasks and develop situational awareness.

When problems develop, there is usually a reversal in the learning curve. This means that the student's performance gets worse instead of better with further instruction and practice. When a reversal takes place, there are some typical things to look for. One is frequency of training. If the student has not been flying on a regular basis, he can lose some of his edge in the time period between lessons. Another popular cause of reversal is lack of attention caused by something interfering with the student's motivation. These interfering factors often come from conflicts at work or from some domestic conflict in the student's life, which take his attention away from his job of learning to fly. I usually advise my flying students to quit their jobs, get a divorce, and convert all their assets to cash, so as not to be distracted from their flying lessons.

A third, unfortunately common, cause of a reversal is that the instructor is violating the building-block principle on which the standard syllabus is based, and is trying to teach subject matter for which the student has not been adequately prepared. I recently had an instrument student who had been doing extremely well in pitching and banking, and I decided to give him the third ball to juggle, the use of power. The student immediately started getting out of sequence, losing his organized scan, and generally getting worse with practice. After one session in which he didn't seem to be able to get anything right, I regressed him to the last task that had brought success. His learning curve took an immediate upward path, and things

returned to normal. In my desire to progress him as fast as possible, I had pushed him a little too hard.

I sometimes get students, who are having learning problems, referred to me from other instructors, and I always ask these students what was the last thing they did successfully. We then go back to that place in the syllabus, and they think I'm some kind of genius for breaking them out of their reversal. It's hard to be humble, friends. But the building-block is one of the most important parts of organizing the training tasks that the instructor should always keep track of.

The third kind of oddity in the learning curve is called a scallop. This means that the student advances to a certain level of performance then regresses then advances back to that level then regresses again. The scallop is most frequently associated with a schedule of training so irregular that the student forgets what he has learned before, causing him not to be able to build on what he has previously learned. I usually encourage my students to set up a regular schedule of lessons, in order to prevent this impediment to learning.

Finally, we should remember that the learning curve can be a bell-shaped graph. If learning acquired is not exercised on a regular basis, it can be lost through lack of practice. "Use it or lose it" is a much-used phrase that contains a good deal of wisdom. I cannot remember how many times I have learned and then forgotten, how to speak Spanish. Most Spanish-speakers come to this country wanting to improve their English, not to help me stay current in speaking their native tongue. In learning theory, we call this loss of knowledge and skill the law of extinction.

This law of learning is particularly troublesome when we acquire some exotic rating that we don't often have a chance to use. In my case, the seaplane rating comes to mind. A more common example is probably the multiengine class rating, which can be acquired in a weekend or so of training and then which is often not used on a regular basis. Amazingly enough, the law requires only three takeoffs, three traffic patterns, and three touch-and-go landings, in order to be current to carry passengers in a multiengine airplane. I shudder to think of a pilot having only that level of competence being confronted with an engine problem on takeoff, shortly after liftoff. It seems to me that the law of extinction should inform us of the need for recurrent training in twins and in other aircraft we seldom fly.

It is a sobering thought that, by demonstrating competence in a glider once every two years, I retain my legal right to carry passengers in all other aircraft I am rated to fly, with only the minimum currency requirements added to that biennial flight review. "A single showing of competence" does not seem to me to be an adequate level of testing to assure the flying public that they are being flown around by a competent pilot.

A working knowledge of the learning curve is an important tool in the instructor's bag of skills, and it is also a good concept for student pilots to be aware of, under the rubric of "metacognition," a student's understanding of his own process of learning.